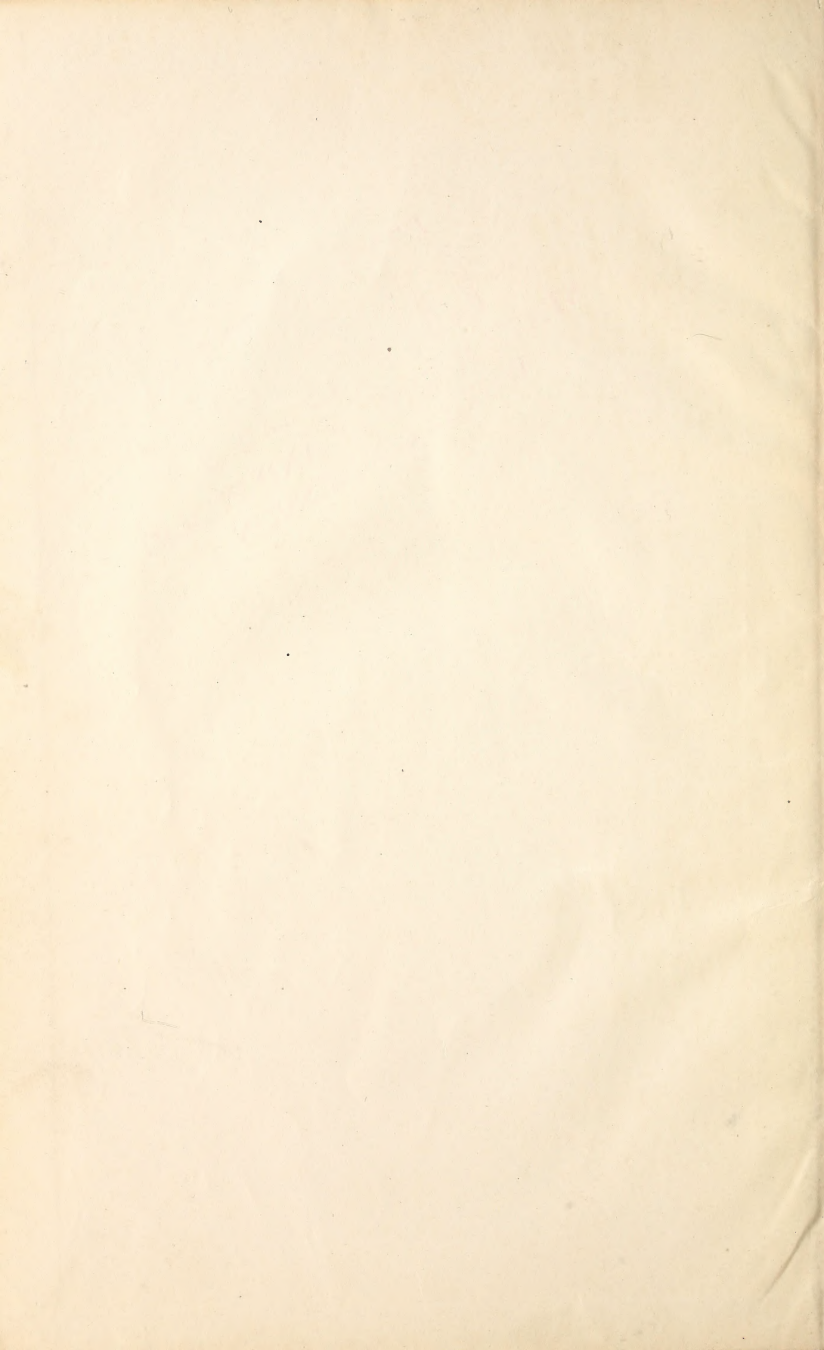


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FOURTH BIENNIAL REPORT
OF THE
State Highway Commission
OF
NORTH CAROLINA
1921-1922

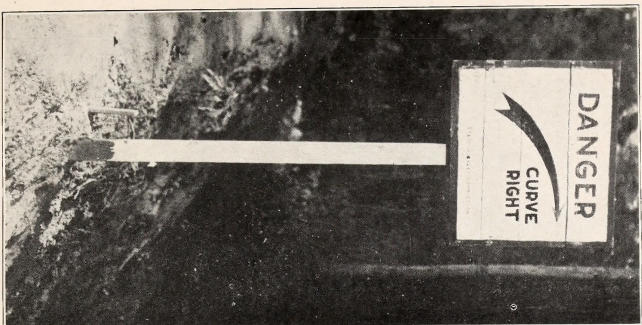


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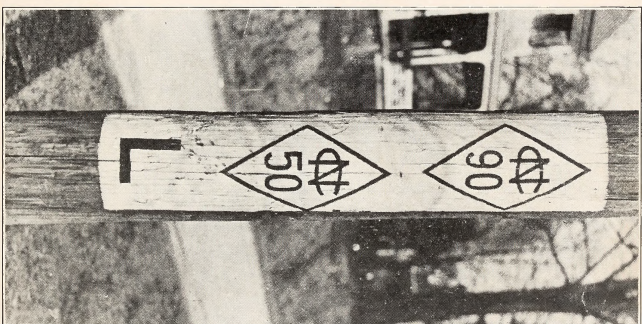
State Highway Commission of North Carolina

FRANK PAGE, <i>Chairman</i>	Raleigh.
W. A. HART, <i>First District</i>	Tarboro.
J. E. CAMERON, <i>Second District</i>	Kinston.
W. A. MCGIRT, <i>Third District</i>	Wilmington.
JOHN SPRUNT HILL, <i>Fourth District</i>	Durham.
J. ELWOOD COX, <i>Fifth District</i>	High Point.
W. C. WILKINSON, <i>Sixth District</i>	Charlotte.
R. A. DOUGHTON, <i>Seventh District</i>	Sparta.
J. C. MCBEE, <i>Eighth District</i>	Bakersville.
J. G. STIKELEATHER, <i>Ninth District</i>	Asheville.

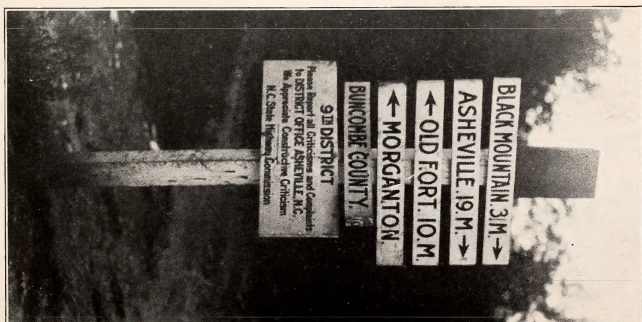
CHAS. M. UPHAM, *State Highway Engineer*.....Raleigh.



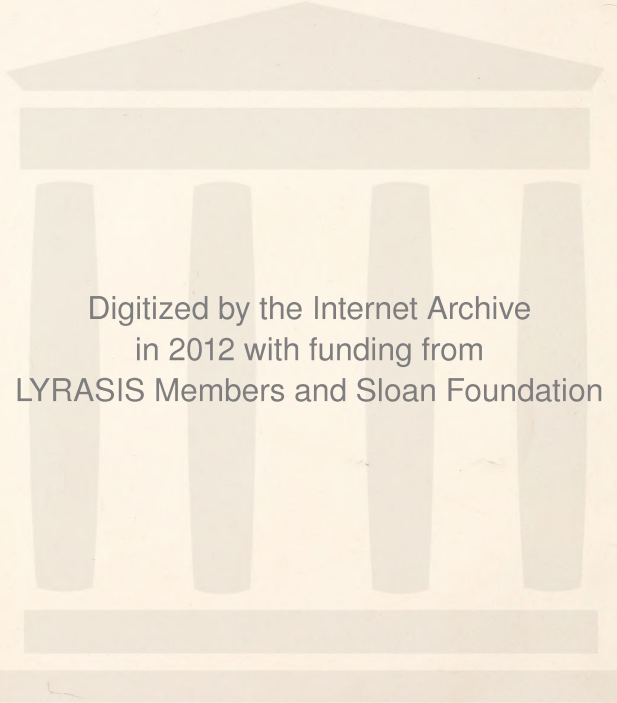
DANGER SIGN



ROUTE MARKER



DIRECTION SIGN



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Letter of Transmittal

RALEIGH, N. C., January 1, 1923.

HONORABLE CAMERON MORRISON, *Governor*,

DEAR SIR:

In accordance with section twenty-three, chapter two, of the Acts of the General Assembly of 1921, I have the honor to submit herewith the fourth biennial report of the North Carolina State Highway Commission.

Respectfully,

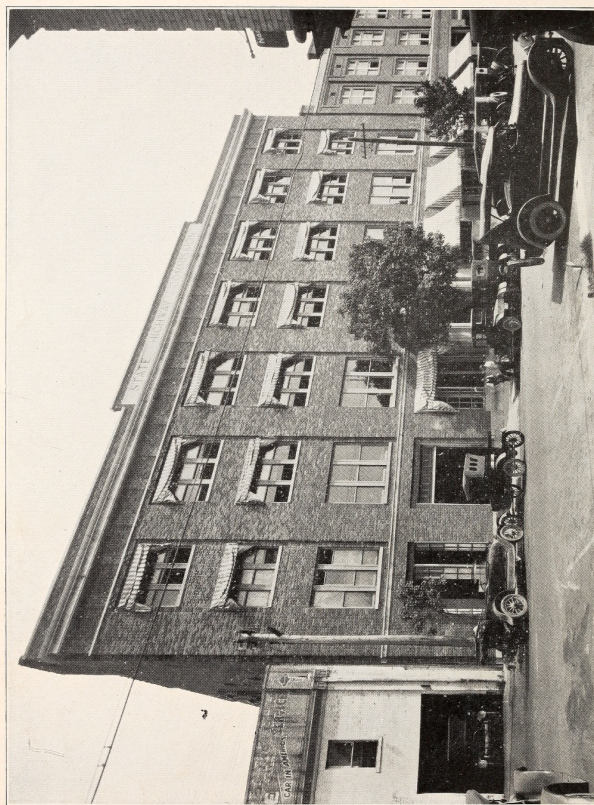
FRANK PAGE, *Chairman*.

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STATE HIGHWAY COMMISSION BUILDING—EAST MORGAN STREET

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FOURTH BIENNIAL REPORT
OF THE
NORTH CAROLINA STATE HIGHWAY
COMMISSION
FOR 1921-1922

FOREWORD

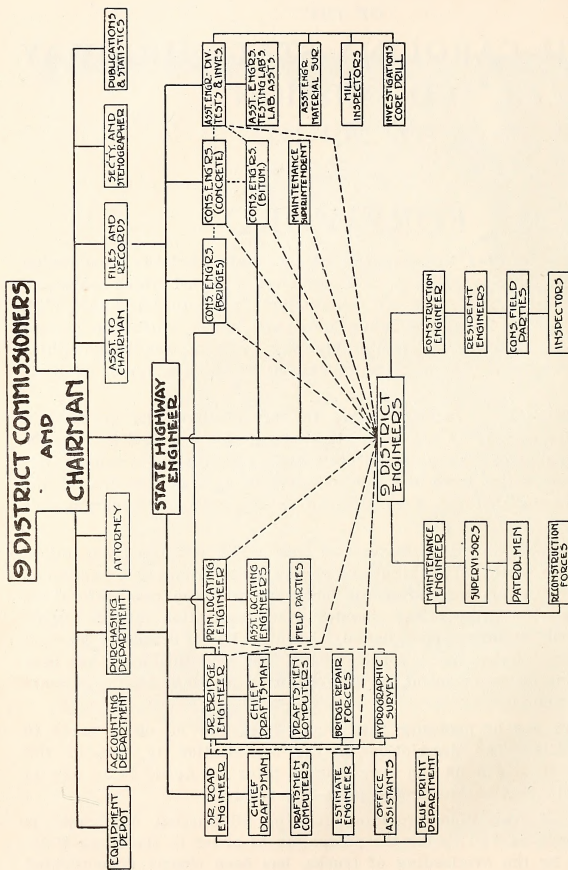
This report, covering the activities of the State Highway Commission from June 30, 1920, to June 30, 1922, embraces a period which marks an epoch in the history of highway construction in North Carolina. With the passage of the Doughton-Connor-Bowie Act, under which the present Commission is operating, in 1921 a highway program was begun which has earned for North Carolina the reputation as being a leader in highway work.

During the period mentioned above the organization has grown into one of the largest and at the same time one of the most efficient in the country. A spirit of loyalty to the State and of hearty coöperation exists throughout the entire force and this accounts in a large measure for the degree of success that has been attained in the extensive program now under way.

One of the most important features of this period was the inauguration of maintenance of the State highways by the State Highway Commission, instead of by County and township forces as was the case before the passage of the 1921 law. This involved the assumption of the responsibility of maintaining approximately 5,000 miles of road of various types, exclusive of that under construction. How well this work has been carried out needs no comment, as the condition of State highways bears sufficient testimony.

This report has of necessity been made brief and no effort made to go into details. The description of the organization is that of the present one, inasmuch as the organization prior to April, 1921, was in substance with that shown in the preceding report.

The need of legislation providing for the elimination of dangerous grade crossings, as well as for the prevention of abuse to the State Highway System by the overloading of trucks, has been clearly demonstrated and it is hoped that some steps will be taken to relieve these conditions.



**NORTH CAROLINA
STATE HIGHWAY COMMISSION
ORGANIZATION CHART**

Note: Dotted Lines = Advisory

MARCH 1922

ORGANIZATION

ADMINISTRATIVE

Commission

The State Highway Commission is composed of nine District Commissioners and the Chairman, known as the State Highway Commissioner and who is the executive head of the organization. The Commission has charge of the expenditure of funds provided by the \$50,000,000 bond issue and of all Federal Aid funds. It also has control of the construction and maintenance of the State Highway System made up of approximately 6,100 miles of road connecting the county seats and principal towns of the State. The Chairman, Mr. Frank Page, is a full-time officer and has under his direction the organization as shown in the chart on the opposite page and described below.

Assistant to Chairman

H. V. Joslin is assistant to Chairman and handles certain administrative matters and correspondence of a non-technical nature. In addition to this, his duties involve matters pertaining to contracts, the purchase of cement, pipe, steel, and other materials purchased by the Commission for use in road construction.

Legal Department

W. L. Cohoon, of Elizabeth City, is the Attorney for the Commission and handles all matters of a legal nature, particularly those involving court proceedings.

Purchasing Department

All purchases of any nature are made through this department of which W. S. Fallis, as Purchasing Agent, is head. By handling these purchases through a central point much labor is saved and a large amount of money saved to the State each year.

Accounting Department

This department is in charge of Homer Peele, an experienced auditor, who, with an able staff of assistants, has charge of all receipts and disbursements, including Federal Aid funds. All matters involving the handling of funds pass through this department. It was said by the Certified Public Accountant who last audited this department that:

"The accounts under the 1921 Law are well kept and the system in use is well designed, provides proper safeguards, affords ample information and shows properly and in good order results and position. The Accounting Department is well organized and the Staff interested, enthusiastic and loyal."

Equipment Depot

Chas. D. Farmer, Superintendent of Motor Equipment, is in charge of this department, one of the most important branches of the Commission. All of the automotive equipment required in the work of the Commission is kept up by this department and all road building material and equipment received from the Federal Government as surplus war material is stored at the depot until such time as it is needed. The depot is located on route No. 10 about four miles west of Raleigh, occupying about 12 acres.

Publications and Statistics

This department is in charge of H. K. Witherspoon, Project Engineer. The work of the department includes the keeping of tabulated records of the various projects throughout the State and other information of a statistical nature; the editing and compiling of the Biennial Report, the publication and distribution of route maps and road information, the photographic work of the Commission, and the furnishing of information to those interested in the work of the Commission. A monthly magazine entitled, "The Highway Bulletin," is published by this department.

ENGINEERING

Chief Engineer

The Engineering Department of the Commission is also under the supervision of the State Highway Commissioner, but is directly in charge of Chas. M. Upham, State Highway Engineer.

Road Department

The Senior Road Engineer, Geo. F. Syme, has charge of the preparation of plans and estimates for all road work. In this department about twenty-five draftsmen and computers are employed in preparing plans, checking estimates, and in other work incidental to the letting of contracts.

Bridge Department

The work of designing and preparing plans for all bridges necessary in State Highway Construction is under the supervision of W. L. Craven, Senior Bridge Engineer. This department is thoroughly organized and is capable of preparing plans and estimates for any type or size of bridge.

In addition to the drafting force of the department there are several bridge repair forces which reconstruct and maintain a number of bridges which were taken over by the Commission.

Description of the Hydrographic Survey, which is also a branch of this department, will be found elsewhere in this report.

Principal Locating Engineer

O. B. Bestor, as principal Locating Engineer, has charge of all location surveys on the State Highway System. A very efficient organization has been worked up in this department and has been the means of saving thousands of dollars to the State. Elsewhere in the report will be found an organization chart of this department.

Construction Engineers

With a view to obtaining better construction on the hard-surfaced roads and bridges six Construction Engineers, all experienced in their line, were appointed as follows: Messrs. C. N. Conner, W. E. Hawkins and G. E. McNutt, on concrete paving; Messrs. E. R. Olbrich and E. E. Strohm on asphaltic-concrete work; and Messrs. C. N. Conner and O. F. Yount on concrete bridge work. These engineers visit the various jobs at intervals and see that the most efficient methods are being used and the best results obtained.

Maintenance Superintendent

J. B. Clingman, Maintenance Supervisor, exercises general supervision over the Maintenance work in the State and acts in an advisory capacity to the District Maintenance Engineers.

Tests and Investigations

G. W. Hutchinson is in charge of this department which conducts tests and investigations of materials used, and available for use, in road construction. In addition to maintaining two laboratories in Raleigh this department has inspectors stationed at various mills from which materials are shipped, conducts a material survey in the State, and operates a core-drill on the hard-surface roads, for the purpose of obtaining test specimens as they are laid.

District Engineers

There are nine District Engineers, as outlined in the report of district construction. These engineers have charge of all work in their respective Districts, each district being practically an individual unit as far as organization is concerned, but at the same time being under the State Highway Engineer.

ROAD LAWS

STATE LAW

AN ACT TO PROVIDE FOR THE CONSTRUCTION AND MAINTENANCE OF A STATE SYSTEM OF HARD-SURFACED AND OTHER DEPENDABLE ROADS CONNECTING BY THE MOST PRACTICABLE ROUTES THE VARIOUS COUNTY-SEATS AND OTHER PRINCIPAL TOWNS OF EVERY COUNTY IN THE STATE FOR THE DEVELOPMENT OF AGRICULTURE, COMMERCIAL AND INDUSTRIAL INTERESTS OF THE STATE, AND TO SECURE BENEFITS OF FEDERAL AID THEREFOR, AND FOR OTHER PURPOSES.

The General Assembly of North Carolina do enact:

SECTION 1. That chapter one hundred and eight-nine of the Public Laws of North Carolina, session one thousand nine hundred and nineteen, be amended so as to hereafter read as follows:

GENERAL PURPOSE OF THE ACT

SEC. 2. The general purposes of this act are for the State to lay out, take over, establish and construct, and assume control of approximately 5,500 miles of hard-surfaced and other dependable highways running to all county-seats, and to all principal towns, State parks, and principal State institutions, and linking up with State highways of adjoining states and with National highways into National Forest Reserves by the most practicable routes, with special view of development of agriculture, commercial, and natural resources of the State, and for the further purpose of permitting the State to assume control of the State highways, repair, construct, and reconstruct and maintain said highways at the expense of the entire State, and to relieve the counties and cities and towns of the State of this burden.

PURPOSE AND INTENT OF ACT—HARD-SURFACED ROADS AND MAINTAINING SAME

SEC. 3. That the purpose and intent of this act is to establish a system of State highways for the State, hard-surfacing said highways as rapidly as possible, and maintaining the entire system of said highways in the most approved manner as outlined in this act. Work on the various links in the State highway system shall be of such a character as will lead to ultimate

hard-surfaced construction as rapidly as money, labor, and materials will permit, and to a State system of durable hard-surfaced, all-weather roads, connecting the various county-seats, principal towns, and cities.

ESTABLISHMENT OF THE COMMISSION

SEC. 4. That a State Highway Commission is hereby created, to consist of a chairman from the State at large, who shall be a practical business man, who shall be known as the State Highway Commissioner; and nine (9) commissioners, one from each construction district as hereinafter designated, three of whom shall be of the minority political party, one for each of the three terms, all to be appointed by the Governor, such appointments to be confirmed by the Senate. The State Highway Commissioner of the existing Highway Commission and all other commissioners whose terms do not expire on April first, one thousand nine hundred and twenty-one, shall hold office during their present unexpired terms. At the expiration of the present term of the chairman, and any commissioner whose term has not expired, his successor shall be appointed by the Governor for a period of six years, such appointment to be confirmed by the Senate. That two of said commissioners shall be appointed for two years from April first, one thousand nine hundred and twenty-one; three of said commissioners shall be appointed for four years from April first, one thousand nine hundred and twenty-one; three of said commissioners shall be appointed for six years each, such appointments to be confirmed by the Senate: *Provided*, that any commissioner appointed or elected under this act may be removed by the Governor for cause. In case of the death, resignation, or removal from his district of any commissioner during his term of office, his successor shall be appointed by the Governor from the same construction district and from the same political party in which the vacancy occurs to fill out his unexpired term, such appointment to be confirmed by the next Senate. At the expiration of the term of the chairman, and the various commissioners, their successors shall be appointed by the Governor for a term of six years each, such appointments to be confirmed by the Senate. The State Highway Commissioner shall devote his entire time and attention to the work of the commission and receive as compensation and salary therefor fifty-five hundred dollars (\$5500) per annum, payable monthly, and his actual traveling expenses when engaged in the discharge of his duties. Said State Highway Commissioner shall be vested with all the authority of said commission when same is not in session. The members of the State Highway Commission, other than the chairman of the commission, shall each receive ten dollars (\$10) per day while engaged in the discharge of the duties of their office, and their actual traveling expenses. The headquarters and main office of the State Highway Commission shall be located at the State Capitol. The members of the said commission, at their first meeting, shall organize and adopt a common seal; they shall keep minutes of their meetings, which shall be open to public inspection; they shall have the power to adopt and enforce rules and regulations for the government of their meetings and proceedings, and for the transaction of the business of the commission; and shall have the

power and authority to make all rules and regulations for carrying out the true intent and purposes of this act. They shall meet at the office of the commission at such regular times, not less than quarterly, as they may by rule provide, and may hold special meetings at any time and place at the call of the chairman, or any five members. The first meeting of the commission, shall be at the call of the Governor as soon as practicable after the ratification of this act.

STATE HIGHWAY ENGINEER AND OTHER EMPLOYEES

SEC. 5. The said commission, at its first meeting or as soon thereafter as practicable, shall employ a State Highway Engineer, who shall be a competent civil engineer, qualified by technical training as well as practical construction experience in highway work. The engineer shall hold office during the pleasure of the commission, but not to exceed a period of four years without reappointment. He shall receive an annual salary to be fixed by the State Highway Commission, approved by the Governor, payable in monthly installments together with such actual and other necessary expenses as may be incurred in the official discharge of his duties. Said commission shall prescribe and fix the duties of the engineer, and shall provide the engineer with offices and sufficient equipment to discharge his duties as prescribed by the State Highway Commission and this act. The commission shall employ such other engineers, clerks, and assistants as may be needed, and at such salaries and for such terms as appear necessary, and prescribe and fix their duties. In the discretion of the commission, such offices may be established in the construction districts as may be necessary to carry out the provisions of this act.

OATH AND BONDS OF COMMISSIONERS AND ENGINEERS

SEC. 6. The members of the State Highway Commission and State Highway Engineer shall each, before entering upon the discharge of his duties, take an oath that he will faithfully and honestly execute the duties of the office during his continuance in office, and each give a bond, to be fixed and approved by the Governor, conditioned upon the faithful discharge of the duties of his office and the full and proper accounting for all public funds and property coming into his possession or under his control. The premium on said bond or bonds shall be paid out of the State Highway Fund.

FIVE THOUSAND FIVE HUNDRED MILES (APPROXIMATE) TAKEN OVER FOR THE STATE HIGHWAY SYSTEM—METHOD

SEC. 7. Fifty-five hundred (5500) miles shall be the approximate maximum limit of mileage of the State highway system.

The designation of all roads comprising the State highway system as proposed by the State Highway Commission shall be mapped, and there shall be publicly posted at the courthouse door in every county in the State a map of all the roads in such county in the State system, and the board of county commissioners or county road-governing body of each county,



PROJECT No. 454—ORANGE COUNTY—DURHAM-CHAPEL HILL BOULEVARD

or street-governing body of each city or town in the State shall be notified of the routes that are to be selected and made a part of the State system of highways; and if no objection or protest is made by the board of county commissioners or the county road-governing body of any county, or street-governing body of any city or town in the State within sixty days after the notification before mentioned, then and in that case the said roads or streets, to which no objections are made, shall be and constitute links or parts of the State highway system. If any objections are made by the board of county commissioners or county road-governing body of any county or street-governing body of any city or town, the whole matter shall be heard and determined by the State Highway Commission in session, under such rules and regulations as may be laid down by the State Highway Commissioner, notice of the time and place of hearing to be given by the State Highway Commission at the courthouse door in the county, and in some newspaper published in the county, at least ten days prior to the hearing, and the decision of the State Highway Commission shall be final. A map showing the proposed roads to constitute the State highway system is hereto attached to this bill and made a part hereof. The roads so shown can be changed, altered, added to or discontinued by the State Highway Commission: *Provided*, no roads shall be changed, altered or discontinued so as to disconnect county-seats, principal towns, State or National parks or forest reserves, principal State institutions, and highway systems of other states. The rights of way to all roads taken over under this act shall be not less than thirty (30) feet: *Provided*, that no toll road shall be taken over under this section unless by agreement or condemnation as herein provided.

COMMISSION ASSUMING CONTROL

SEC. 8. Within sixty days after the ratification of this act, the State Highway Commission shall commence to assume control of the various links of road constituting the State highway system, and shall complete the assumption of control of all the roads which constitute the State highway system as rapidly as practicable.

SEC. 9. (a) After the selection of a part or parts of the State highway system, the commission may cause roads, comprising such system, including connecting streets in incorporated towns and cities, to be distinctly marked with some standard design placed on convenient objects along such routes. Such design shall be uniform on all parts of the State highway system, except that the numbers thereon shall correspond with the numbers given the various routes by the commission, which numbers shall coincide with the numbers placed on the official map or maps issued by the commission. No similar design shall be used for marking other routes in North Carolina.

GUIDE AND WARNING SIGNS

(b) After selection of State highways before mentioned, the commission may cause to be erected such standard guide or warning signs as it may deem necessary along the State highway system. Such signs shall be of uniform design throughout the State, and it shall be unlawful

for any person to erect or display any other guide or warning signs upon said highway except in case of emergency, or with the approval of the commission, and, if erected without such approval they may be removed by the commission, and any violator of this section shall be subject to all penalties hereinafter provided.

DIRECTING SIGNS

(c) After taking over section or sections of the State highway system, the commission may erect proper and uniform signs directing persons to roads and places of importance.

(d) Said commission shall have the power to control all signs within the right of way of State highways.

POWERS OF STATE HIGHWAY COMMISSION

SEC. 10. The said State Highway Commission shall be vested with the following powers:

(a) The general supervision over all matters relating to the construction of the State highways, letting of contracts therefor, and the selection of materials to be used in the construction of State highways under the authority of this act.

(b) To take over and assume exclusive control for the benefit of the State of any existing county or township roads, and to locate and acquire rights of way for any new roads that may be necessary for a State highway system, with full power to widen, relocate, change, or alter the grade or location thereof; to change or relocate any existing roads that the State Highway Commission may now own or may acquire; to acquire by gift, purchase, or otherwise any road or highway that may be necessary for a State highway system: *Provided*, that nothing in this act shall be construed to authorize or permit the Highway Commission to allow or pay anything to any county, township, city, or town, or to any board of commissioners or governing body thereof, for any existing road or part of any road heretofore constructed by any such county, township, city, or town, unless contract has already been entered into by the State Highway Commission.

(c) To provide for such road materials as may be necessary to carry on the work of the State Highway Commission, either by gift, purchase, or condemnation.

(d) To enforce by mandamus or other proper legal remedies all legal rights or causes of action of the State Highway Commission with other public bodies, corporations, or persons.

(e) To regulate the use of and police traffic on State highways, and prevent their abuse by individuals, corporations, and public-service corporations, by heavy vehicles, trucks, tractors, trailers, or other heavy or destructive vehicles or machinery, and unnecessary destruction incident to the laying of underground pipes.

(f) To establish a traffic census to secure information about the relative use, cost, value, importance, and necessity of roads forming a part of the

State highway system, which information shall be a part of the public records of the State, and upon which information the State Highway Commission shall, after due deliberation and in accordance with these established facts, proceed to order the construction of the particular highway or highways.

(g) To assume full and exclusive responsibility for the maintenance of all roads other than streets in towns and cities, forming a part of the State highway system from date of acquiring said roads: *Provided*, the commission may enter into contracts with counties as to the maintenance of highways which shall form a part of the State highway system. The State Highway Commission shall have authority to maintain all streets constructed by the State Highway Commission in towns of less than three thousand population by the last census, and such other streets as may be constructed in towns and cities at the expense of the State Highway Commission, whenever in the opinion of the State Highway Commission it is necessary and proper so to do.

(h) To give suitable names to State highways and change the names of any highways that shall become a part of the State system of highways.

(i) To coöperate with municipal or county authorities, civic bodies and individuals in the proper selection, planting and protection of roadside trees, shrubs and vines for the beautification and protection of said highways.

FEDERAL AID

(j) That the said State Highway Commission shall have such powers as are necessary to comply fully with the provisions of the present or future Federal Aid Acts. The said Commission is hereby authorized to enter into all contracts and agreements with the United States Government relating to the survey, construction, improvement and maintenance of roads under the provision of the present or future Congressional enactments, to submit such scheme or program of construction or improvement and maintenance as may be required by the Secretary of Agriculture or otherwise provided by Federal Acts, and to do all other things necessary to carry out fully the coöperation contemplated and provided for by present or future acts of Congress, for the construction or improvement and maintenance of rural post roads. The good faith and credit of the State are further hereby pledged to make available funds necessary to meet the requirements of the acts of Congress, present or future, appropriating money to construct and improve rural post roads and apportioned to this State during each of the years for which Federal funds are now or may hereafter be apportioned by the said act or acts, to maintain the roads constructed or improved with the aid of funds so appropriated and to make adequate provisions for carrying out such construction and maintenance. The good faith and credit of the State are further pledged to maintain such roads now built with Federal aid and hereafter to be built and to make adequate provisions for carrying out such maintenance.

REPAIR OF ROAD DETOUR

SEC. 11. It shall be mandatory upon the State Highway Commission, its officers and employees, or any contractor or subcontractor employed by the said commission, to select, lay out, maintain and keep in as good repair as possible suitable detours by the most practical route while said highways or roads are being improved or constructed and it shall be mandatory upon the said Highway Commission and its employees or contractors to place or cause to be placed explicit directions to the traveling public during repair of said highway or road under the process of construction. All expense of laying out and maintaining said detours shall be paid out of State Highway Fund.

CLOSING OF STATE HIGHWAYS DURING CONSTRUCTION, INJURY TO
BARRIERS, WARNING SIGNS, ETC.

SEC. 12. If it shall appear necessary to the State Highway Commission, its officers, or appropriate employees, to close any road or highway coming under jurisdiction so as to permit of proper completion of work which is being performed, such commission, its officers or employees, may close, or cause to be closed, the whole or any portion of such road or highway deemed necessary to be excluded from public travel. While any such road or highway, or portion thereof, if so closed, or while any such road or highway, or portion thereof, is in process of construction or maintenance, such commission, its officers or appropriate employees, or its contractor, under authority from such commission, may erect, or cause to be erected, suitable barriers or obstructions thereon, may post, or cause to be posted, conspicuous notices to the effect that the road or highway, or portion thereof, is closed, warning signs, lights and lanterns on such road or highway, or portions thereof. When such road or highway is closed to the public or in process of construction or maintenance, as provided herein, any person who wilfully breaks down, drives into new construction work, removes, injures or destroys any such barrier or barriers or obstructions on road being constructed, or tears down, removes or destroys any such notices, drives into new construction work, or extinguishes, removes, injures or destroys any such warning lights or lanterns so erected, posted or placed, shall be guilty of a misdemeanor.

REGULATING OPENINGS, STRUCTURES, PIPES, TREES, ETC., ON THE STATE
HIGHWAYS, AND THE ISSUANCE OF PERMITS

SEC. 13. No opening shall be made in any State road or highway other than streets in cities and towns, nor shall any structure be placed thereon, nor shall any structure which has been placed thereon be changed or removed except in accordance with a written permit from the State Highway Commission or its duly authorized officers, who shall exercise complete and permanent control over such roads and highways. No State road or State highway, other than streets in cities and towns, shall be dug up for laying or placing pipes, conduits, sewers, wires, railways, or other objects, and no tree or shrub in or on any State road or State highway shall be planted, trimmed, or removed, and no obstruction placed

thereon, without a written permit as hereinbefore provided for, and then only in accordance with the regulations of said Highway Commission or its duly authorized officers or employees; and the work shall be under the supervision and to the satisfaction of the State Highway Commission or its officers or employees, and the entire expense of replacing the highway in as good condition as before shall be paid by the persons, firms, or corporations to whom the permit is given, or by whom the work is done; the State Highway Commission, or its duly authorized officers, may, in its discretion, before granting a permit under the provisions of this act, require the applicant to file a satisfactory bond, payable to the State of North Carolina, in such an amount as may be deemed sufficient by the State Highway Commission or its duly authorized officers, conditioned upon the proper compliance with the requirements of this act by the person, firm, or corporation granted such permit. Any person making any opening in a State road or State highway, or placing any structure thereon, or changing or removing any structure thereon without obtaining a written permit as herein provided, or not in compliance with the terms of such permit, or otherwise violating the provisions of this act, shall be guilty of a misdemeanor: *Provided*, this section shall not apply to railroad crossings. The railroads shall keep up said crossings as now provided by law.

TO ENCOURAGE COUNTY ROAD BUILDING

SEC. 14. To encourage counties to build hard-surfaced or other dependable roads constituting a part of the State highway system before same can be constructed by the State Highway Commission, the said commission is hereby authorized and empowered to enter into contracts and agreements with said county or counties for fair reimbursement for said expense: *Provided*, said road or bridge is built in accordance with the specifications and under the direction of the State Highway Commission.

SEC. 15. That all contracts over one thousand dollars that the commission may let for construction, or any other kinds of work necessary to carry out the provisions of this act, shall be let, after public advertising, under rules and regulations to be made and published by the State Highway Commission, to a responsible bidder, the right to reject any and all bids being reserved to the State Highway Commission.

TOWNS TO BEAR ONE-HALF HARD-SURFACE CONSTRUCTION

SEC. 16. That when any portion of the State highway system shall run through any city or town of more than three thousand inhabitants according to the last United States census, the streets of which in some considerable part shall have been paved or hard surfaced prior to such highway construction, and it shall be found necessary to connect the State highway system with such improved streets as may be designated as part of such system, the State Highway Commission shall bear the entire cost of constructing such connecting links, the same to be uniform in dimensions and materials with such State highways, unless such city or

town shall voluntarily assume and undertake the improvements of the streets forming such connecting links according to specifications approved by the State Highway Commission. In all other cases of improving streets of cities and towns of over three thousand population embraced in the State highway system, the entire cost of construction shall be borne by the cities or towns traversed by such highways:

Provided, however, in extraordinary cases, or when the conditions, in the opinion of the State Highway Commission, justify it, said commission may, in its discretion, relieve any city or town of any or all of the cost of the construction of said road through said city or town, or may impose such conditions upon or make such arrangements with said city or town in connection with the construction of said road, as in its discretion may seem wise and just under all the facts and circumstances in connection therewith:

Provided further, that whenever any street designated as part of the State highway system shall be surfaced by order of the State Highway Commission, at the expense, in whole or in part, of a city or town, it shall be lawful for the governing body of such city or town to declare an assessment district as to the street to be improved, without petition by the owners of property abutting thereon, and to charge the proportionate cost thereof to such property.

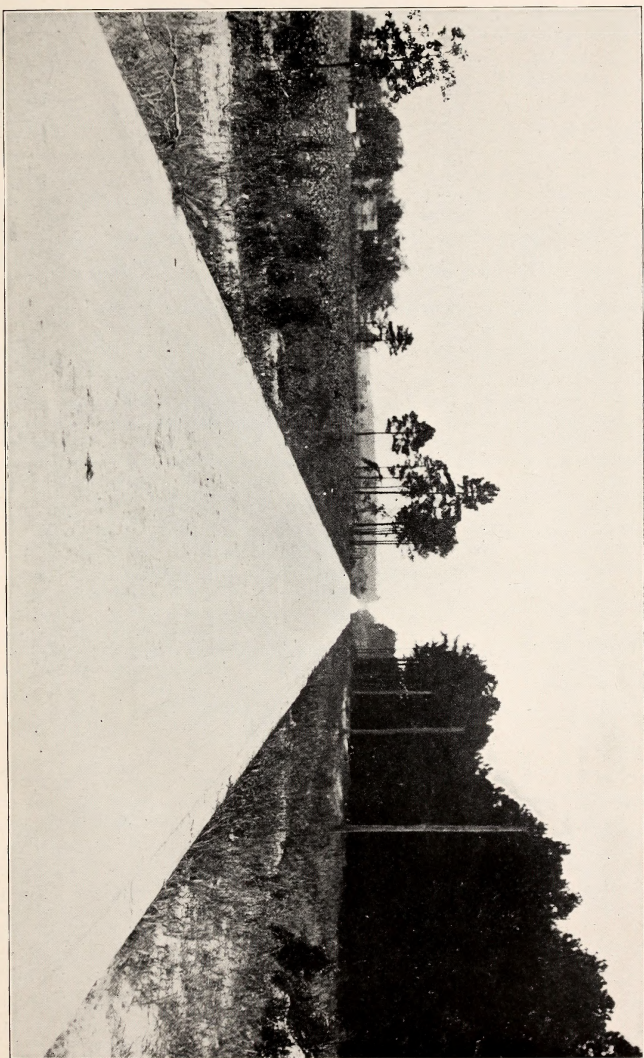
Notice shall be given such incorporated cities or towns by the State Highway Commission of hard-surfacing work to be done within their corporate limits, and on streets that are links in the State highway system, and said notice shall also set forth a reasonable time limit as to when said work shall be completed: *Provided,* that if said city or town fails to do work, or fails to complete same within the time specified, or within the requirements of the State Highway Commission, then it shall be the duty of the State Highway Commission to take over said work, charging all expenses incurred therefor, which are properly chargeable under this section, to said city or town; subject, however, to the foregoing provisos and conditions.

WORKING OF STATE CONVICTS

SEC. 17. That all able-bodied male convicts sentenced to the State Prison may be assigned to work upon the State highway system under the direction of the State Highway Commission. That the cost or hire of the able-bodied male convicts to the State Highway Commission shall be agreed upon between the State Highway Commission and the Governor and chairman of the Prison Board, on the basis of paying the actual expenses in working said convicts, including food, clothing, housing, guarding, transportation and incidental expenses by the State Highway Commission to the State Prison Board.

WORKING OF COUNTY CONVICTS

SEC. 18. That the State Highway Commission may make contracts and agreements with the board county commissioners or road-governing bodies of any county in the State for the purpose of hiring any county convicts



PROJECT No. 125—EDGECONIBE COUNTY

to be worked on the State highway system or in the production of materials for use in constructing State highways, and for constructing State highways.

GRADE CROSSINGS

SEC. 19. The State Highway Commission shall use every endeavor to avoid grade crossings on railroads, and shall either go under or over the railroad tracks when practicable: *Provided*, that nothing in this act shall in any manner release any railroad from its just proportion of the expense incident to eliminating grade crossings or to give railroads the power to force the State Highway Commission to eliminate grade crossings when in the judgment of the said Highway Commission the elimination of grade crossings is not practicable.

MAINTENANCE, UPKEEP, AND CONTROL

SEC. 20. In assuming control of the roads constituting the State highway system, the commission shall assume as soon as practicable the maintenance and upkeep of said roads, and shall as soon as practicable organize a proper and sufficient patrol force to keep said roads in good condition. In the event of failure to maintain said roads in good condition, upon complaint of the board of county commissioners, or road-governing body of any county, the State Highway Commission shall at once investigate such complaint, and if the same be well founded, then it shall at once order the repair and maintenance of the road complained of, and investigate the neglect of the person in charge of the road so complained of, and, if upon investigation the person or persons in charge of the road complained of be at fault, he may promptly be discharged from the service of the commission.

EMPLOYMENT OF COUNSEL

SEC. 21. The State Highway Commission may in its discretion employ any attorney or attorneys to advise them for the purpose of condemning land acquired by this act, making any contracts, and do other legal work that the commission may believe necessary for carrying out this act, and compensation for all such services shall be paid out of the State Highway Fund.

SEC. 22. The State Highway Commission is vested with the power to acquire such rights of way and title to such land, gravel, gravel beds, or bars, sand, sand beds or bars rock, stone, boulders, quarries, or quarry beds, lime, or other earth or mineral deposits or formations, and such standing timber as it may deem necessary and suitable for road construction, maintenance, and repair, and the necessary approaches and ways through, and a sufficient amount of land surrounding and adjacent thereto, as it may determine to enable it to properly prosecute the work, either by purchase, donation, or condemnation, in the manner hereinafter set out: *Provided*, that the right of condemnation provided for in this act shall not apply to gravel beds or bars, sand beds or bars, rock, stone, boulders, quarries, or quarry beds, lime, or other earth, or mineral deposits or formations, in actual bona fide operation by private enterprise. The State Highway Commission is also vested with the power to acquire such additional

land along side of the rights of way or roads as in its opinion may be necessary and proper for the protection of the roads and roadways, and such additional area as may be necessary as by it determined for approaches to and from such material and other requisite area as may be desired by it for working purposes.

Whenever the State Highway Commission and the owner or owners of the lands, materials, and timber required by the State Highway Commission to carry on the work as herein provided for, are unable to agree as to the price thereof, the State Highway Commission is hereby vested with the power to condemn the lands, materials, and timber, and in so doing the ways, means, methods, and procedure of chapter thirty-three of the Consolidated Statutes of North Carolina, entitled "Eminent Domain," shall be used by it as near as the same is suitable for the purposes of this act.

In case condemnation shall become necessary the State Highway Commission is authorized to enter the lands and take possession of the same, and also take possession of such materials and timber as is required by it prior to bringing the proceeding for condemnation, and prior to the payment of the money for the said property.

In the event the owner or owners shall appeal from the report of the commissioners, it shall not be necessary for the State Highway Commission to deposit the money assessed with the clerk, but it may proceed and use the property to be condemned until the final determination of the action.

REPORTS TO THE STATE

SEC. 23. The Highway Commission shall, on or before the tenth day of the convening of each regular session of the General Assembly of North Carolina, make full printed, detailed report to the General Assembly, showing the construction and maintenance work and the cost of the same, receipts of license fees, and disbursements of the commission, and such other data as may be of interest in connection with the work of the Highway Commission. A full account of each road project shall be kept by and under the direction of the Highway Commission or its representatives, to ascertain at any time the expenditures and the liabilities against all projects; also records of contracts and force account work. The account records, together with all supporting documents, shall be open at all times to the inspection of the Governor or road authorities of any county, or their authorized representatives, and copies thereof shall be furnished such officials upon request.

SEC. 24. That the books and accounts of the Highway Commission shall be audited at least once a year by a certified public accountant to be designated by the Auditor of the State, and report of certified accountant shall be made a part of the accompanying report of the State Highway Commission to the General Assembly as herein provided.

CONSTRUCTION DISTRICTS

SEC. 25. That with the special view of an equitable distribution of the construction funds throughout all portions of the State, the State shall

be divided into nine (9) construction districts, the same being designated and indicated on the map hereto attached to this act, and work in each of the construction districts shall be started as simultaneously as practicable and continued so in each district. The commission may change, reform, and relocate the lines of said construction districts.

APPORTIONMENT OF FUNDS TO CONSTRUCTION DISTRICTS

SEC. 26. The State Highway Commission shall apportion among the various construction districts as nearly as possible an equal amount of the construction fund on the basis of one-third in the ratio of population district to the entire area of the State, one-third in the ratio of population of the districts, as determined by the last United States census, to the entire population of the State, and one-third in the ratio of the State highway mileage of the district in proportion to the total mileage of State highways.

SEC. 27. That for the purpose of carrying out the provisions of this act and provide for the maintenance and construction of the highways contemplated under this act from the funds derived from the various taxes levied under this act, there shall first be set aside the sum of two hundred and fifty thousand dollars (\$250,000) annually, or so much thereof as may be necessary to defray the expenses of the State Highway Commission. There shall next be set aside a sum annually sufficient to pay the interest on the bonds issued under this act, the remainder of said fund to be used by the Highway Commission in the maintenance of the highways taken over under the provision of this act, and to be adopted and designated by the commission as State highways under the provisions of this act; any part of the two hundred and fifty thousand dollars (\$250,000) set apart for the expenses of the commission, and any part of the balance unexpended in the payment of interest on the bonds, shall pass each year under the control of the Highway Commission and be used by it in the maintenance and construction of the State system of highways herein provided for. All funds derived from the taxes herein levied, or from the sale of the bonds herein provided for, may be used by the commission in meeting the requirements of the United States Government as to Federal aid: *Provided*, that all necessary expenses of collecting the said license or registration fees or other State highway funds hereinafter provided for, including clerical assistance, the cost of furnishing number plates and mailing same, and for such blanks, books, and other supplies as cannot be furnished by the State Printer, shall be paid for monthly by the Auditor from the revenue derived from fees or taxes that are collected, said expenses shall be approved by the Governor and Council of State, and shall not in the aggregate exceed ten per cent of the total amount collected by the Secretary of State under this act.

REGISTRATION, LICENSING, AND PERMIT FEES

SEC. 28. That the fees for the registration and licensing of vehicles as herein required shall be according to the following schedules:

RATES FOR AUTOMOBILES

24. h. p. or less	\$12.50 per year
Over 24 h. p., and not more than 30 h. p.	20.00 per year
More than 30 h. p., and less than 35 h. p.	30.00 per year
35 h. p. or more	40.00 per year

Motor vehicles used for the transportation of passengers for hire shall pay fifty per cent more than the above rates.

Horsepower shall be computed according to the N. A. C. C. formula of rating for all motor vehicles equipped with internal combustion engines. On motor vehicles operated by steam or electricity the horsepower rating shall be computed according to the rating by the manufacturer of such vehicle.

RATES FOR MOTOR TRUCKS

Trucks with carrying capacity less than 1,000 pounds	\$ 12.50
1,000 pounds and under one ton	15.00
One ton and under two tons	25.00
Two tons and under three tons	75.00
Three tons and under four tons	200.00
Four tons and over	300.00
On all trailers, \$15 per ton carrying capacity.	

MOTORCYCLES

\$5 on each motorcycle, and \$5 for each motorcycle side-car.

DEALERS IN MOTOR VEHICLES

Registration fee and first five plates	\$25.00
Each additional plate	1.00

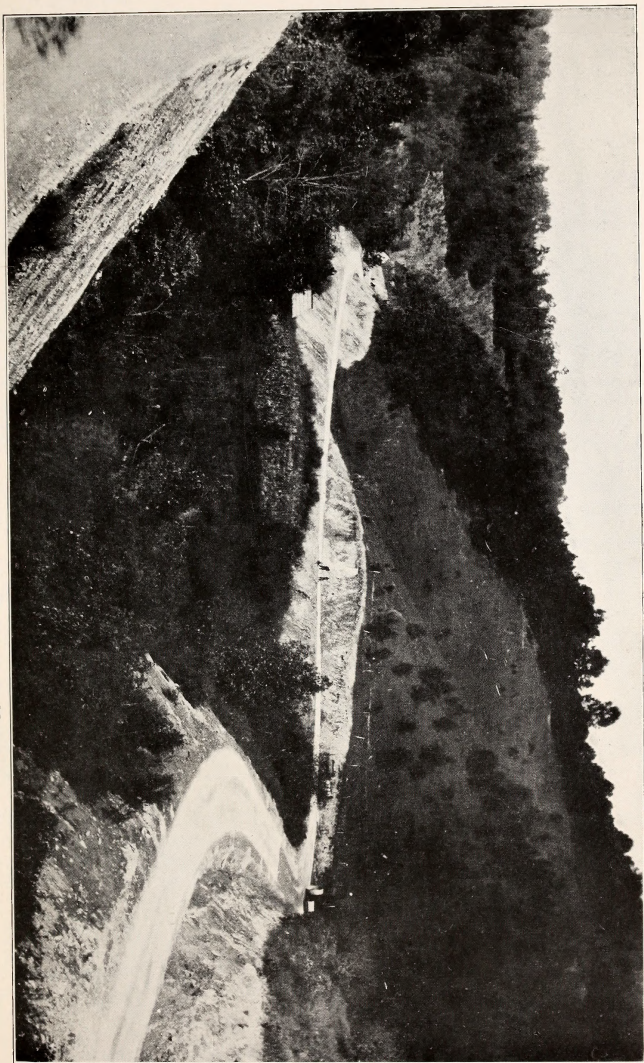
The fiscal year for the collection of automobile licenses shall terminate June thirtieth. The fee for licenses issued after January first of each year, and before June thirtieth, for the period ending June thirtieth, shall be one-half the annual fee.

The foregoing schedule of license fees on motor vehicles shall become effective July first, one thousand nine hundred and twenty-one, and the present schedule of license fees shall remain in force until said date. The fiscal year for the payment of said license fees shall begin July first of each year.

FEES TO COVER LICENSES, ETC.

SEC. 29. The foregoing fees shall be paid to the Secretary of State at the time of issuance of said registration certificates, permits, or license. They shall include all costs of registration, issuance of permits, licenses, and certificates, and the furnishing of registration plates, and shall be in lieu of all other State or local taxes (except *ad valorem*), registration, or license fees, privilege taxes, or other charges: *Provided, however*, a county, city, or town may charge a license or registration fee on motor vehicles in the sum of one dollar (\$1) per annum: *Provided further*, that no county, city, or town shall charge or collect an additional fee for the privilege

PROJECT NO. 980—Macon County—Waterbound Macadam



of operating a motor vehicle, either as chauffeur's or driver's license: *Provided*, nothing herein shall prevent the governing authorities of any city from regulating, licensing, controlling of chauffeurs and drivers of any such car or vehicle, and charging a reasonable fee: *Provided further*, that any city or town may charge a license not to exceed fifty dollars (\$50) for any motor vehicle used in transporting persons or property for hire in lieu of all other charges, fees, and licenses now charged.

VIOLATION A MISDEMEANOR

SEC. 30. Any person, firm, or corporation that shall operate any motor vehicle upon any highway of the State, without license, as is required under this act, shall be guilty of a misdemeanor and fined or imprisoned in the discretion of the court. No motor or other vehicle or trailer which has a greater rated weight of both vehicle and load exceeding seven and one-half (7½) tons shall go over or be operated upon any State highway. Any person, firm, or corporation violating the provisions of this section shall be guilty of a misdemeanor.

SEC. 31. For the purpose of carrying out the provisions of this act the funds collected hereunder shall be kept by the State Treasurer in a separate fund to be known and designated as "State Highway Fund," and all moneys directed to be paid out under this act shall be paid by the State Treasurer upon voucher issued by the State Highway Commission, and charged to the State Highway Fund.

GASOLINE TAX

SEC. 32. The following words, terms, and phrases in this section of this act for the purposes hereof are defined as follows:

(a) "Motor vehicles" shall include all vehicles, movable engines, or machines which are operated or propelled by combustion of gasoline, or other volatile and inflammable liquid fuels, and are operated and used for travel on the public highways.

(b) "Motor vehicle fuels" are such fuels known as gasoline, benzine, naptha, liberty fuel, and such other volatile and inflammable liquids produced or compounded for the purpose of operating or propelling motor vehicles, except the product commonly known as kerosene oil.

(c) The term "dealer" is hereby defined as any person or corporation who has in his, its, or their possession, for sale to the consumer, any gasoline, benzine, naptha, liberty fuel, and such other volatile or inflammable liquids produced or compounded for operating or propelling motor vehicles as herein defined for use, distribution or sale in the State.

SEC. 33. That in addition to the taxes now provided for by law, each and every dealer, as defined in this act, who is now engaged, or who may hereafter engage, in his own name or in the name of others, or in the name of his representatives or agents in this State, in the sale or distribution as dealers or distributors of motor vehicle fuel as herein defined, shall not later than the twentieth day of each calendar month, render a statement to the Secretary of State, showing all motor vehicle fuel purchased for sale and delivered during the preceding calendar month, and pay a license tax

of one cent per gallon on all motor vehicle fuel so purchased as shown by such statement in the manner and within the time aforesaid: *Provided, however,* that whenever any dealer or distributor of motor vehicle fuel shall show to the satisfaction of the Secretary of State, by complying with such rules and regulations as shall be made by the Secretary of State for that purpose, that the tax hereby provided to be paid by the dealer or distributor of motor vehicle fuel as aforesaid has been voluntarily paid by the wholesale dealer, then and in that event the reports required by this act to be made by such dealer or distributor, and by the wholesale dealer, shall not be required to be made, and the dealer or distributor shall not be required to pay the tax hereby levied.

That every wholesale dealer selling any motor vehicle fuel in the State shall render to the Secretary of State every thirty days a statement of all the sales in the State, which statement shall contain the name and business address of the dealer and the date and amount of such sale. Any wholesale dealer wilfully failing to comply with the provisions of this section shall be guilty of a misdemeanor and fined or imprisoned in the discretion of the court.

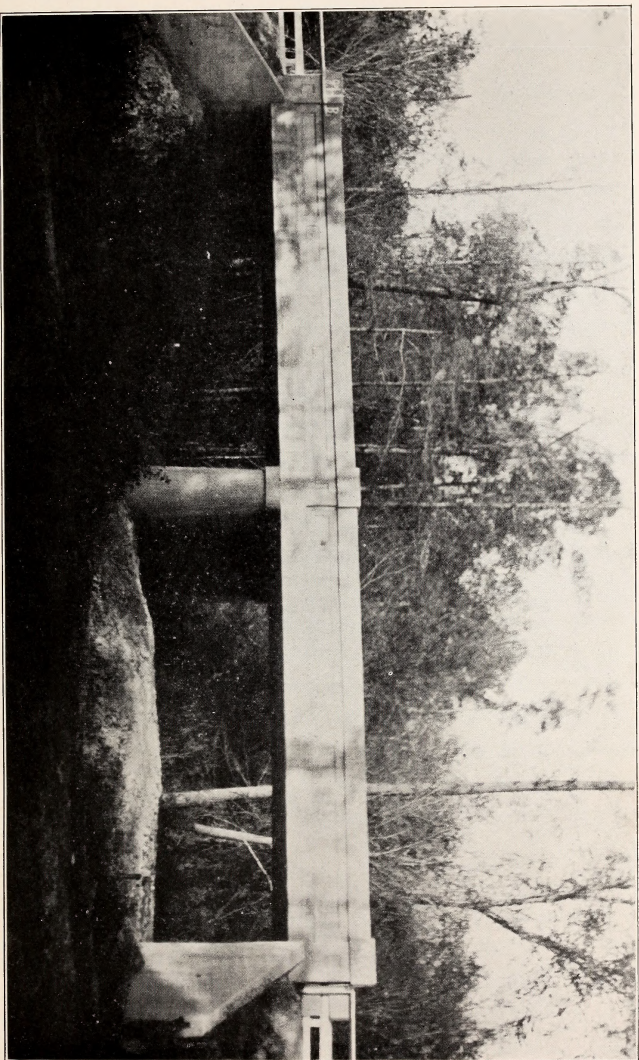
SEC. 34. Every dealer in motor vehicle fuel shall render to the Secretary of State, on or before the twentieth day of each month, on forms prescribed, prepared, and furnished by the Secretary of State, a sworn statement of the number of gallons of motor vehicle fuel purchased and sold to be used in motor vehicles as herein defined by him or them during the preceding calendar month, which statement shall be sworn to by one of the principal officers in the case of a domestic corporation, or by the resident general agent of a foreign corporation, by the managing agent or owner in case of a firm or association, and shall contain an itemized account of the dates and quantities of motor vehicle fuel purchased.

SEC. 35. Said license tax shall be paid on or before the twentieth day of each month to the Secretary of State, who shall receipt the dealer therefor and promptly turn over to the State Treasurer as other receipts of his office, and the State Treasurer shall place the same to the credit of the "State Highway Fund," to be expended as provided by this act.

SEC. 36. Every dealer in motor vehicle fuel shall keep a record in such form as may be prescribed by the Secretary of State of all purchases of motor vehicle fuel; such records to include copies of all invoices or bills of all such purchases, and shall at all times during the business hours of the day be subject to inspection by the Secretary of State or his deputies, or such other officers as may be duly authorized by said Secretary of State.

SEC. 37. Any dealer, association of persons, firm, or corporation violating any of the provisions of this act shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not to exceed one hundred dollars (\$100), or by imprisonment in the county jail for a period not to exceed six months, or both.

SEC. 38. If any person, firm, or corporation shall fail to pay the tax on motor vehicle fuel, due by such person, firm, or corporation under the provisions of this act, within thirty (30) days after such tax shall be due, the State Treasurer shall bring the appropriate action in the courts of the State for the recovery of such tax, and if it shall be found as a



HANDSOME CONCRETE BRIDGE ON PROJECT NO. 436—HARNETT COUNTY

fact that such failure to pay was wilful on the part of such person, firm, or corporation, judgment shall be rendered against such person, firm, or corporation for double the amount of the tax found to be due, together with cost, and the amount collected shall be placed by the State Treasurer to the "State Highway Fund." All remedies now, or which may hereafter be given by the laws of the State of North Carolina for the collection of taxes, are expressly given herein for the collection of the judgment recovered by the State Treasurer under this section.

BOND ISSUE FOR BOND CONSTRUCTION

SEC. 39. That for the purpose of carrying out the provisions of this act, and enabling the State to avail itself to the fullest extent of all Federal aid funds that are now or may become available for use in the State for road purposes, the State Treasurer is hereby authorized, empowered, and directed to issue and sell serial bonds of the State payable in not less than ten nor more than forty years from the date of issue, and aggregating not more than fifty million dollars (\$50,000,000), to be known, styled, and designated "State of North Carolina Highway Serial Bonds," said bonds to mature in annual installments or series, to be determined and fixed by the Governor and Council of State. Not more than ten million dollars (\$10,000,000) of said bonds may be issued and sold in the year one thousand nine hundred and twenty-one; and not more than ten million dollars (\$10,000,000) of said bonds may be issued and sold in the year one thousand nine hundred and twenty-two; and the balance may be issued and sold at the rate of ten million dollars (\$10,000,000) per annum: *Provided, however,* that if the progress of the work shall be such as to justify it, then, and in that event, more than ten million dollars (\$10,000,000) of the total amount herein authorized may be issued and sold in any one year at the request of the State Highway Commission, and by and with the consent of the Governor and Council of State.

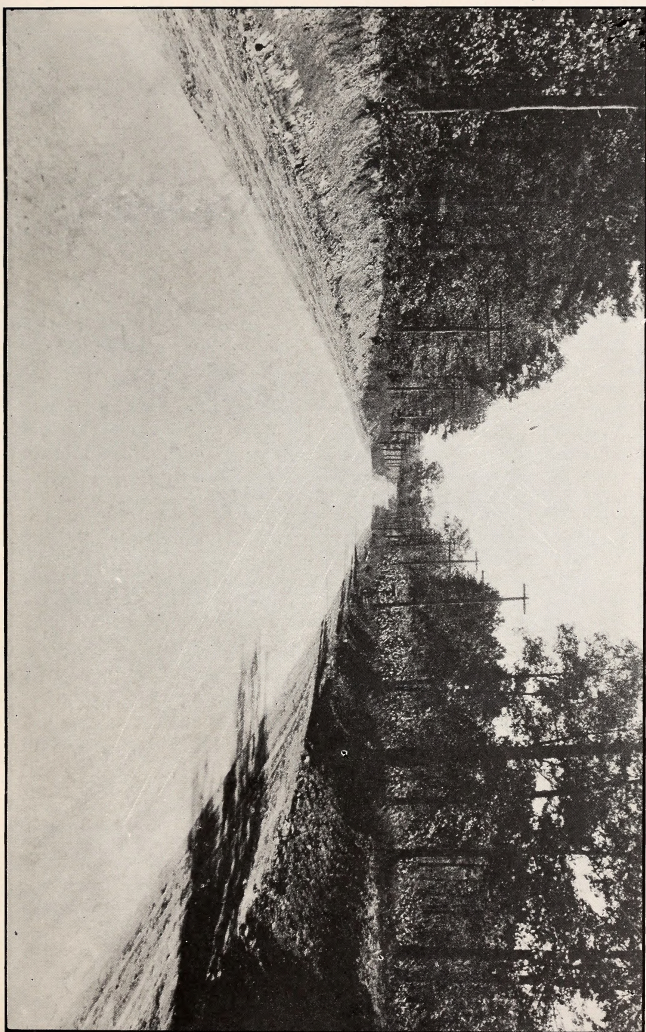
SEC. 40. That all of said bonds shall bear interest at a rate to be fixed by the Governor and Council of State, but not exceeding five per cent per annum, and are to be dated the first day of January or July, as the case may be, after the ascertainment is made by the State Treasurer, as provided for in this act. Interest on said bonds shall be payable semi-annually on the first day of January and July of each and every year so long as any portion of said bonds shall remain unpaid; and when sold and turned over to the State Treasurer all of said fund to be part of the construction fund and known as the "State Highway Fund."

SEC. 41. That all bonds authorized and issued under this act shall be coupon or registered bonds of the denomination of one hundred dollars (\$100), five hundred dollars (\$500), and one thousand dollars (\$1,000), respectively, or such other denominations as the State Treasurer may determine, and shall be signed by the Governor and the State Treasurer, and sealed with the great seal of the State. The coupons thereon may be signed by the the great seal of the State. Two coupons thereon may be signed by the State Treasurer alone, or he may have lithographed, engraved, or printed thereon a *facsimile* of his signature. The said bonds shall be in all other respects in such form as the State Treasurer may direct. The coupons

after maturity shall be receivable in payment of taxes, debts, dues, licenses, fines, and demands due the State of any kind whatsoever, which shall be expressed on the face of the bonds. Before selling the bonds herein authorized to be issued, the State Treasurer shall advertise the sale and invite sealed bids in such manner as in his judgment may seem most effectual to secure the best price. He is authorized to accept bids for the entire amount of such issue to be sold in any one year, or any portion thereof, and when the conditions are equal, he shall give the preference of purchase to the citizens of North Carolina; and he is empowered to sell the bonds herein authorized in such manner as in his judgment will produce the best price, but not for less than par and accrued interest and the full faith, credit, and taxing power of the State are hereby pledged for the payment of the principal and interest of the bonds herein authorized to be issued and sold. All expenses necessarily incurred in the preparation and sale of the bonds shall be paid from the proceeds of such sale.

SEC. 42. In the event any of the bonds issued pursuant to this act shall be registered bonds, the State Treasurer shall cause such bond or bonds to be made payable to the owner, both as to principal and interest; and the State Treasurer is authorized by rules and regulation promulgated by him to provide for the registration of such bond or bonds either in the office of the State Treasurer or at the office of some registrar or transfer agent, notice of which shall appear on the face of the bond. After registration a bond may be transferred on such register by the registered owner in person or by attorney, upon presentation to the bond registrar, accompanied by delivery of a written instrument of the transfer in a form approved by the bond registrar of the State Treasurer and executed by the registered owner. If the holder of any coupon bond shall desire to convert said coupon bond into a registered bond, such owner, upon surrender of said bond with all interest coupons attached thereto, may have issued to him a registered bond in lieu and place thereof, under rules and regulations to be promulgated by the State Treasurer, and when such coupon bond is exchanged for a registered bond, the State Treasurer shall cause the said coupon bond with all interest coupons attached to be cancelled as is otherwise provided by law for the cancellation of State bonds, and the privilege to convert said coupon bond for a registered bond shall be stated in the face of the coupon bond when issued. The State Treasurer shall not issue a registered bond in lieu and place of the coupon bond unless all the coupons not due are attached thereto.

SEC. 43. The said bonds and coupons and notes issued in anticipation of the sale of the bonds, or for the payment of the interest thereon shall be exempt from all State, county, and municipal taxation or assessments, direct or indirect, general or special, whether imposed for the purposes of general revenue or otherwise, and the interest thereon shall not be subject to taxation as for incomes, nor shall said bonds and coupons and notes issued in anticipation of sale of the bonds, or for the payment of the interest thereon, or instalment of principal, be subject to taxation when constituting a part of the surplus of any bank, trust company or other corporation.



PROJECT No. 692—UNION COUNTY

SEC. 44. It shall be lawful for all executors, administrators, guardians, and fiduciaries generally, and all sinking-fund commissioners to invest any moneys in their hands in said bonds when such investments are made.

SEC. 45. The State Treasurer, by and with the consent of the Governor and Council of State, is hereby authorized to borrow money at the lowest rate of interest obtainable, in anticipation of the sale of the bonds herein authorized, and for the purposes for which said bonds are authorized to be issued. The State Treasurer is hereby further authorized, by and with the consent of the Governor and Council of State, to borrow money at the lowest rate of interest obtainable, for the purpose of paying the interest on, or any instalments of the said bonds, in the event that there are not sufficient funds in the State Treasury with which to pay said interest or instalments of principal as they respectively fall due. The State Treasurer shall execute and issue notes of the State for the money so borrowed, and he is hereby authorized to renew any such notes from time to time by issuing new notes. The rate of interest, the date of payment of said notes or renewals, and all matters and details in connection with the issuance and sale thereof shall be fixed and determined by the Governor and Council of State. Such notes when issued shall be entitled to all the privileges, immunities and exemptions that the bonds authorized to be issued are entitled to. The full faith, credit and taxing power of the State are hereby pledged for the payment of such notes as may be issued, and all interest thereon. The proceeds received from said notes, other than notes that may be issued to pay interest or instalments of principal of the bonds, shall be placed by the State Treasurer in the "State Highway Fund" herein provided for. The notes issued in anticipation of the sale of the bonds shall be paid with funds derived from the sale of bonds, unless otherwise provided for by the General Assembly. The notes issued for the payment of interest shall be paid from the funds collected under this act, as herein provided for, when collected, unless otherwise provided for by the General Assembly.

HOW FUNDS PAID OUT

SEC. 46. The State Highway Commission, under rules and regulations established by the Commission, shall have full control over the funds in the hands of the State Treasurer known as the "State Highway Fund," and the same shall be paid out by the State Treasurer upon proper voucher of the State Highway Commission for carrying out the purposes of this act.

LAW TO BE PUBLISHED

SEC. 47. That the State Highway Commission, as soon as practicable after the ratification of this act, shall have carefully compiled the road laws of this State relating to the State highway system, and shall have published not exceeding 10,000 copies of said compilation to be distributed by said commission, the cost thereof to be paid out of the State Highway Fund.

SEC. 48. All contracts or agreements heretofore made or entered into by the existing Highway Commission as to location and construction of

any roads or highways, or for any other purpose, shall be and remain in full force and effect and taken over by the Highway Commission provided for in this act, and all contractors who have entered into any contract with the existing Highway Commission, whether private or municipal, shall carry out such contracts so made and all rights and remedies existing under such contracts by the present Highway Commission or any contractor shall remain in full force and effect.

MALFEASANCE A FELONY

SEC. 49. Any member of the Highway Commission, or any person employed by the Highway Commission in connection with carrying on the work outlined in this act, who shall knowingly, or fraudulently, perform any act with intent to injure the State, or any contractor, or his agent or employee, who shall conspire with a member of the Highway Commission or employee thereof or any State official to permit a violation of the contract or contractor with intent to injure the State, or any agent or employee of any contractor who shall do any work on any State highway in violation of contract, and with intent to defraud the State, and the member of the State Highway Commission employee or State official so conspiring shall each be guilty of a felony, and upon conviction thereof, shall be confined in the State Prison not less than one year and not more than five years, and be liable to the State in a civil action instituted by the State on relation of the State Highway Commission, for double the amount the State may have lost by reason thereof.

SEC. 50. The board of county commissioners or other road-governing bodies of the various counties in the State are hereby relieved of all responsibility or liability for the upkeep or maintenance of any of the roads or bridges thereon constituting the State highway system, after the same shall have been taken over, and the control thereof assumed by the State Highway Commission and the State Highway Commission both as a commission and the individual members thereof, shall not be liable for any damage sustained by any person, firm, or corporation on the said State highway system, except for wanton and corrupt negligence.

SEC. 51. That if any provision of this act shall be declared by the court's unconstitutional, such declaration shall not affect the validity of any of the remaining provisions of this act.

SEC. 52. All laws and clauses of laws in conflict with the provision of this act except chapter 64 of the Public Laws of the Extra Session of the General Assembly of nineteen twenty, are to the extent of such conflict hereby repealed.

SEC. 53. Until the organization of the State Highway Commission provided for in this act the present existing State Highway Commission shall continue in effect and be authorized to act pursuant to chapter 189, Public Laws of nineteen nineteen and all other laws in force at this time relating to the State Highway Commission, and to enter into contracts, which, together with all existing contracts, shall be taken over by the State Highway Commission created by this act, and in all other respects this act shall be in force from and after the date of its ratification.

Ratified this the 3rd day of March, A. D. 1921.

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10 (FEDERAL AID LAW

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[PUBLIC—No. 87—67TH CONGRESS.]

[S. 1072.]

An Act to amend the Act entitled "An Act to provide that the United States shall aid the States in the construction of rural post roads, and for other purposes," approved July 11, 1916, as amended and supplemented, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the Federal Highway Act.

SEC. 2. That, when used in this Act, unless the context indicates otherwise—

The term "Federal Aid Act" means the Act entitled "An Act to provide that the United States shall aid the States, in the construction of rural post roads, and for other purposes," approved July 11, 1916, as amended by sections 5 and 6 of an Act entitled "An Act making appropriations for the service of the Post Office Department for the fiscal year ending June 30, 1920, and for other purposes," approved February 28, 1919, and all other Acts amendatory thereof or supplementary thereto.

The term "highway" includes rights of way, bridges, drainage structures, signs, guard rails and protective structures in connection with highways, but shall not include any highway or street in a municipality having a population of two thousand five hundred or more as shown by the last available census, except that portion of any such highway or street along which within a distance of one mile the houses average more than two hundred feet apart.

The term "State highway department" includes any State department, commission, board or official having adequate powers and suitably equipped and organized to discharge to the satisfaction of the Secretary of Agriculture the duties herein required.

The term "maintenance" means the constant making of needed repairs to preserve a smooth surfaced highway.

The term "construction" means the supervising, inspecting, actual building and all expenses incidental to the construction of a highway, except locating, surveying, mapping and costs of rights of way.

The term "reconstruction" means a widening or a rebuilding of the highway or any portion thereof to make it a continuous road, and of sufficient width and strength to care adequately for traffic needs.

The term "forest roads" means roads wholly or partly within or adjacent to and serving the national forests.

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The term "State funds" includes for the purposes of this Act funds raised under the authority of the State, or any political or other subdivision thereof, and made available for expenditure under the direct control of the State highway department.

SEC. 3. All powers and duties of the Council of National Defense under the Act entitled "An Act making appropriations for the support of the Army for the fiscal year ending June 30, 1917, and for other purposes," approved August 29, 1916, in relation to highway or highway transport, are hereby transferred to the Secretary of Agriculture, and the Council of National Defense is directed to turn over to the Secretary of Agriculture the equipment, material, supplies, papers, maps and documents utilized in the exercise of such powers. The powers and duties of agencies dealing with highways in the national parks or in military or naval reservations under the control of the United States Army or Navy, or with highways used principally for military or naval purposes, shall not be taken over by the Secretary of Agriculture, but such highways shall remain under the control and jurisdiction of such agencies.

The Secretary of Agriculture is authorized to co-operate with the State highway departments, and with the Department of the Interior in the construction of public highways within Indian reservations, and to pay the amount assumed therefor from the funds allotted or apportioned under this Act to the State wherein the reservation is located.

SEC. 4. That the Secretary of Agriculture shall establish an accounting division which shall devise and install a proper method of keeping the accounts.

SEC. 5. That the Secretary of War be, and he is hereby, authorized and directed to transfer to the Secretary of Agriculture, upon his request, all war material, equipment and supplies now or hereafter declared surplus, from stock now on hand and not needed for the purposes of the War Department but suitable for use in the improvement of highways, and that the same shall be distributed among the highway departments of the several States to be used in the construction, reconstruction and maintenance of highways, such distribution to be upon the same basis as that hereinafter provided for in this Act in the distribution of Federal-aid fund: *Provided*, That the Secretary of Agriculture, in his discretion, may reserve from such distribution not to exceed 10 per centum of such material, equipment and supplies for use in the construction, reconstruction and maintenance of national forest roads or other roads constructed, reconstructed or maintained under his direct supervision.

SEC. 6. That in approving projects to receive Federal aid under the provisions of this Act the Secretary of Agriculture shall give preference to such projects as will expedite the completion of an adequate and connected system of highways, interstate in character.

Before any projects are approved in any State, such State, through its State highway department, shall select or designate a system of highways not to exceed 7 per centum of the total highway mileage of such State as shown by the records of the State highway department at the time of the passage of this Act.

Upon this system all Federal-aid apportionments shall be expended.

Highways which may receive Federal aid shall be divided into two classes, one of which shall be known as primary or interstate highways, and shall not exceed three-sevenths of the total mileage which may receive Federal



GUARD-RAIL ON PROJECT NO. 436—HARNETT COUNTY

aid, and the other which shall connect or correlate therewith and be known as secondary or intercounty highways, and shall consist of the remainder of the mileage which may receive Federal aid.

The Secretary of Agriculture shall have authority to approve in whole or in part the systems as designated or to require modifications or revisions thereof: *Provided*, That the States shall submit to the Secretary of Agriculture for his approval any proposed revisions of the designated systems of highways above provided for.

Not more than 60 per centum of all Federal aid allotted to any State shall be expended upon the primary or interstate highways until provision has been made for the improvement of the entire system of such highways: *Provided*, That with the approval of any State highway department the Secretary of Agriculture may approve the expenditure of more than 60 per centum of the Federal aid apportioned to such State upon the primary or interstate highways in such State.

The Secretary of Agriculture may approve projects submitted by the State highway departments prior to the selection, designation and approval of the system of Federal-aid highways herein provided for if he may reasonably anticipate that such projects will become a part of such system.

Whenever provision has been made by any State for the completion and maintenance of a system of primary or interstate and secondary or intercounty highways equal to 7 per centum of the total mileage of such State, as required by this Act, said State, through its State highway department, by and with the approval of the Secretary of Agriculture, is hereby authorized to add to the mileage of primary or interstate and secondary or intercounty systems as funds become available for the construction and maintenance of such additional mileage.

SEC. 7. That before any project shall be approved by the Secretary of Agriculture for any State, such State shall make provision for State funds required each year of such States by this Act for construction, reconstruction and maintenance of all Federal-aid highways within the State, which funds shall be under the direct control of the State highway department.

SEC. 8. That only such durable types of surface and kinds of materials shall be adopted for the construction and reconstruction of any highway which is a part of the primary or interstate and secondary or intercounty systems as will adequately meet the existing and probable future traffic needs and conditions thereon. The Secretary of Agriculture shall approve the types and width of construction and reconstruction and the character of improvement, repair and maintenance in each case, consideration being given to the type and character which shall be best suited for each locality and to the probable character and extent of the future traffic.

SEC. 9. That all highways constructed or reconstructed under the provisions of this Act shall be free from tolls of all kinds.

That all highways in the primary or interstate system constructed after the passage of this Act shall have a right of way of ample width and a wearing surface of an adequate width which shall not be less than eighteen feet, unless, in the opinion of the Secretary of Agriculture, it is rendered impracticable by physical conditions, excessive costs, probable traffic or legal obstacles.

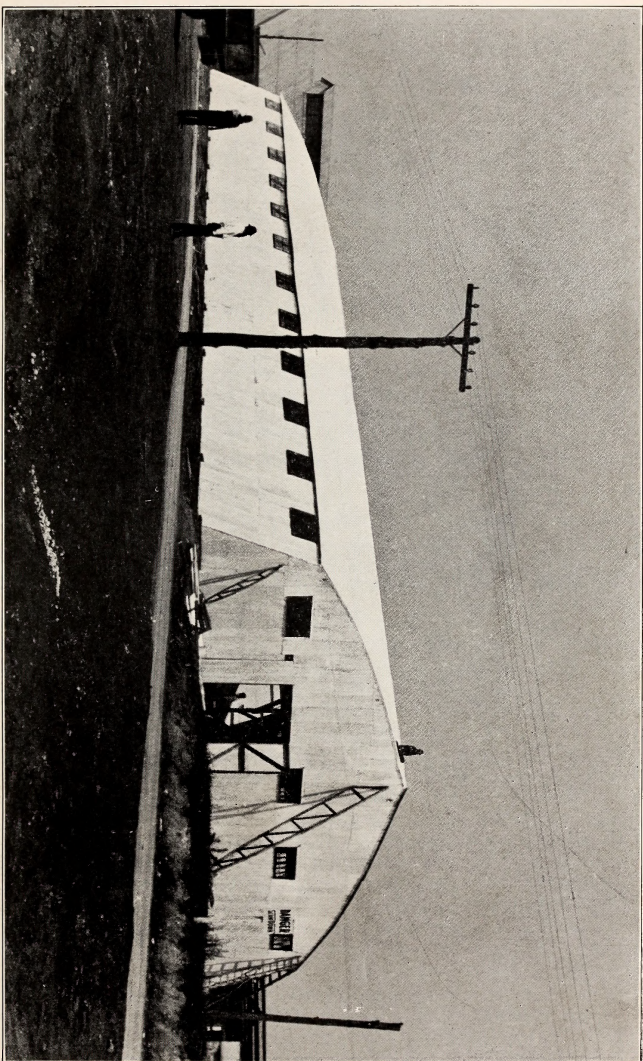
SEC. 10. That when any State shall have met the requirements of this Act, the Secretary of the Treasury, upon receipt of certification from the governor of such State to such effect, approved by the Secretary of Agriculture, shall immediately make available to such State, for the purpose set forth in this Act, the sum apportioned to such State as herein provided.

SEC. 11. That any State having complied with the provisions of this Act, and desiring to avail itself of the benefits thereof, shall by its State highway department submit to the Secretary of Agriculture project statements setting forth proposed construction or reconstruction of any primary or interstate, or secondary or inter-county highway therein. If the Secretary of Agriculture approve the project, the State highway department shall furnish to him such surveys, plans, specifications and estimates therefor, as he may require; items included for engineering, inspection and unforeseen contingencies shall not exceed 10 per centum of the total estimated cost of its construction.

That when the Secretary of Agriculture approves such surveys, plans, specifications and estimates, he shall notify the State highway department and immediately certify the fact to the Secretary of the Treasury. The Secretary of the Treasury shall thereupon set aside the share of the United States payable under this Act on account of such projects, which shall not exceed 50 per centum of the total estimated cost thereof, except that in the case of any State containing unappropriated public lands exceeding 5 per centum of the total area of all lands in the State, the share of the United States payable under this Act on account of such projects shall not exceed 50 per centum of the total estimated cost thereof plus a percentage of such estimated cost equal to one-half of the percentage which the area of the unappropriated public lands in such State bears to the total area of such State: *Provided*, That the limitation of payments not to exceed \$20,000 per mile, under existing law, which the Secretary of Agriculture may make be, and the same is hereby increased in proportion to the increased percentage of Federal aid authorized by this section: *Provided, further*, That these provisions relative to the public-land State shall be done in accordance with its laws and under the direct super- by the Federal Aid Act and payment for approved projects upon which actual building construction work had not begun on the 30th day of June, 1921.

9-12-21
SEC. 12. That the construction and reconstruction of the highways or parts of highways under the provisions of this Act, and all contracts, plans, specifications and estimates relating thereto, shall be undertaken by the State highway departments subject to the approval of the Secretary of Agriculture. The construction and reconstruction work and labor in each State shall be done in accordance with its laws and under the direct supervision of the State highway department, subject to the inspection and approval of the Secretary of Agriculture and in accordance with the rules and regulations pursuant to this Act.

SEC. 13. That when the Secretary of Agriculture shall find that any project approved by him has been constructed or reconstructed in compliance with said plans and specifications, he shall cause to be paid to the proper authorities of said State the amount set aside for said project.



TRUCK REPAIR SHED AT EQUIPMENT DEPOT

That the Secretary of Agriculture may, in his discretion, from time to time, make payments on such construction or reconstruction as the work progresses, but these payments, including previous payments, if any, shall not be more than the United States pro rata part of the value of the labor and materials which have been actually put into such construction or reconstruction in conformity to said plans and specifications. The Secretary of Agriculture and the State highway department of each State may jointly determine at what time and in what amounts, payments as work progresses shall be made under this Act.

Such payments shall be made by the Secretary of the Treasury, on warrants drawn by the Secretary of Agriculture, to such official or officials or depository as may be designated by the State highway department and authorized under the laws of the State to receive public funds of the State.

SEC. 14. That should any State fail to maintain any highway within its boundaries after construction or reconstruction under the provisions of this Act, the Secretary of Agriculture shall then serve notice upon the State highway department of that fact, and if within ninety days after receipt of such notice said highway has not been placed in proper condition of maintenance, the Secretary of Agriculture shall proceed immediately to have such highway placed in a proper condition of maintenance and charge the cost thereof against the Federal funds allotted to such State, and shall refuse to approve any other project in such State, except as hereinafter provided.

Upon the reimbursement by the State of the amount expended by the Federal Government for such maintenance, said amount shall be paid into the Federal highway fund for reapportionment among all the States for the construction of roads under this Act, and the Secretary of Agriculture shall then approve further projects submitted by the State as in this Act provided.

Whenever it shall become necessary for the Secretary of Agriculture under the provisions of this Act to place any highway in a proper condition of maintenance the Secretary of Agriculture shall contract with some responsible party or parties for doing such work: *Provided, however,* That in case he is not able to secure a satisfactory contract he may purchase, lease, hire or otherwise obtain all necessary supplies, equipment and labor, and may operate and maintain such motor and other equipment and facilities as in his judgment are necessary for the proper and efficient performance of his functions.

SEC. 15. That within two years after this Act takes effect the Secretary of Agriculture shall prepare, publish and distribute a map showing the highways and forest roads that have been selected and approved as a part of the primary or interstate, and the secondary or inter-county systems, and at least annually thereafter shall publish supplementary maps showing his program and the progress made in selection, construction and reconstruction.

SEC. 16. That for the purpose of this Act the consent of the United States is hereby given to any railroad or canal company to convey to the highway department of any State any part of its right of way or other property in that State acquired by grant from the United States.

SEC. 17. That if the Secretary of Agriculture determines that any part of the public lands or reservations of the United States is reasonably necessary for the right of way of any highway or forest road or as a source of materials for the construction or maintenance of any such highway or forest road adjacent to such lands or reservations, the Secretary of Agriculture shall file with the Secretary of the department supervising the administration of such land or reservation a map showing the portion of such lands or reservations which it is desired to appropriate.

If within a period of four months after such filing the said Secretary shall not have certified to the Secretary of Agriculture that the proposed appropriation of such land or material is contrary to the public interest or inconsistent with the purposes for which such land or materials have been reserved, or shall have agreed to the appropriation and transfer under conditions which he deems necessary for the adequate protection and utilization of the reserve, then such land and materials may be appropriated and transferred to the State highway department for such purposes and subject to the conditions so specified.

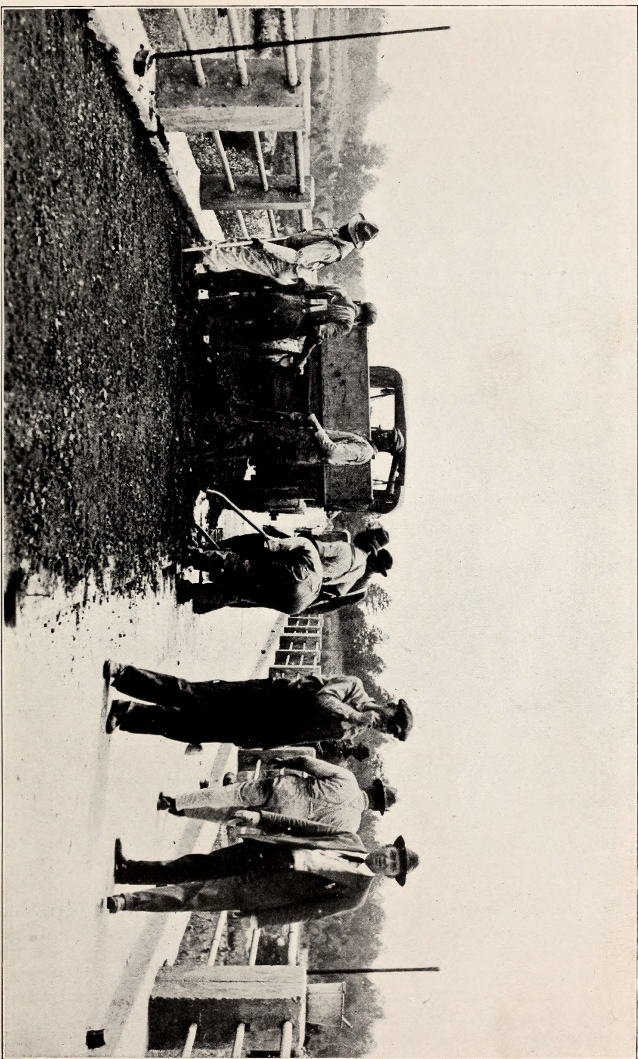
If at any time the need for any such lands or materials for such purposes shall no longer exist, notice of the fact shall be given by the State highway department to the Secretary of Agriculture, and such lands or materials shall immediately revert to the control of the Secretary of the department from which they had been appropriated.

SEC. 18. That the Secretary of Agriculture shall prescribe and promulgate all needful rules, and regulations for the carrying out of the provisions of this Act, including such recommendations to the Congress and the State highway departments as he may deem necessary for preserving and protecting the highways and insuring the safety of traffic thereon.

SEC. 19. That on or before the first Monday in December of each year, the Secretary of Agriculture shall make a report to Congress, which shall include a detailed statement of the work done, the status of each project undertaken, the allocation of appropriations, an itemized statement of the expenditures and receipts during the preceding fiscal year under this Act, an itemized statement of the traveling and other expenses, including a list of employees, their duties, salaries and traveling expenses, if any, and his recommendations, if any, for new legislation amending or supplementing this Act. The Secretary of Agriculture shall also make such special reports as Congress may request.

SEC. 20. That for the purpose of carrying out the provisions of this Act there is hereby appropriated, out of the moneys in the Treasury not otherwise appropriated, \$75,000,000 for the fiscal year ending June 30, 1922, \$25,000,000 of which shall become immediately available, and \$50,000,000 of which shall become available January 1, 1923.

SEC. 21. That so much, not to exceed 2½ per centum, of all moneys hereby or hereafter appropriated for expenditure under the provisions of this Act, as the Secretary of Agriculture may deem necessary for administering the provisions of this Act and for carrying on necessary highway research and investigational studies independently or in co-operation with the State highway departments and other research agencies, and for publishing the results thereof, shall be deducted for such purposes, available until expended.



LAYING ROCK ASPHALT WEARING SURFACE ON SLOAN'S FERRY BRIDGE BY STATE
MAINTENANCE FORCES

Within sixty days after the close of each fiscal year the Secretary of Agriculture shall determine what part, if any, of the sums theretofore deducted for such purposes will not be needed and apportion such part, if any, for the fiscal year then current in the same manner and on the same basis as are other amounts authorized by this Act apportioned among all the States, and shall certify such apportionment to the Secretary of the Treasury and to the State highway departments.

The Secretary of Agriculture, after making the deduction authorized by this section, shall apportion the remainder of the appropriation made for expenditure under the provision of the Act for the fiscal year among the several States in the following manner: One-third in the ratio which the area of each State bears to the total area of all the States; one-third in the ratio which the population of each State bears to the total population of all the States, as shown by the latest available Federal census; one-third in the ratio which the mileage of rural delivery routes and star routes in each State bears to the total mileage of rural delivery and star routes in all the States at the close of the next preceding fiscal year, as shown by certificate of the Postmaster General, which he is directed to make and furnish annually to the Secretary of Agriculture: *Provided*, That no State shall receive less than one-half of 1 per centum of each year's allotment. All moneys herein or hereafter appropriated for expenditure under the provisions of this Act shall be available until the close of the second succeeding fiscal year for which apportionment was made: *Provided, further*, That any sums apportioned to any State under the provisions of the Act entitled "An Act to provide that the United States shall aid the States in the construction of rural post roads, and for other purposes," approved July 11, 1916, and all Acts amendatory thereof and supplemental thereto, shall be available for expenditure in that State for the purpose set forth in such Acts until two years after the close of the respective fiscal years for which any such sums become available, and any amount so apportioned remaining unexpended at the end of the period during which it is available for expenditure under the terms of such Acts shall be reapportioned according to the provisions of the Act entitled "An Act to provide that the United States shall aid the States in the construction of rural post roads, and for other purposes," approved July 11, 1916: *And provided, further*, That any amount apportioned under the provisions of this Act unexpended at the end of the period during which it is available for expenditure under the terms of this section shall be reapportioned within sixty days thereafter to all the States in the same manner and on the same basis, and certified to the Secretary of the Treasury and the State highway departments in the same way as if it were being apportioned under this Act for the first time.

SEC. 22. That within sixty days after the approval of this Act the Secretary of Agriculture shall certify to the Secretary of the Treasury and to each of the State highway departments the sum he has estimated to be deducted for administering the provisions of this Act and the sums which he has apportioned to each State for the fiscal year ending June 30, 1922, and on or before January 20, next, preceding the commencement of each succeeding fiscal year and shall make like certificates for each fiscal year.

SEC. 23. That out of the moneys in the Treasury not otherwise appropriated, there is hereby appropriated for the survey, construction, reconstruction and maintenance of forest roads and trails, the sum of \$5,000,000 for the fiscal year ending June 30, 1922, available immediately and until expended, and \$10,000,000 for the fiscal year ending June 30, 1923, available until expended.

(a) Fifty per centum, but not to exceed \$3,000,000 for any one fiscal year, of the appropriation made or that may hereafter be made for expenditure under the provisions of this section shall be expended under the direct supervision of the Secretary of Agriculture in the survey, construction, reconstruction and maintenance of roads and trails of primary importance for the protection, administration and utilization of the national forests, or when necessary, for the use and development of the resources upon which communities within or adjacent to the national forests are dependent, and shall be apportioned among the several States, Alaska and Porto Rico by the Secretary of Agriculture, according to the relative needs of the various national forests, taking into consideration the existing transportation facilities, value of timber or other resources served, relative fire danger, and comparative difficulties of road and trail construction.

The balance of such appropriations shall be expended by the Secretary of Agriculture in the survey, construction, reconstruction and maintenance of forest roads of primary importance to the State, counties or communities within, adjoining, or adjacent to the national forests, and shall be prorated and apportioned by the Secretary of Agriculture for expenditures in the several States, Alaska and Porto Rico, according to the area and value of the land owned by the Government within the national forests therein as determined by the Secretary of Agriculture from such information, investigation, sources and departments as the Secretary of Agriculture may deem most accurate.

(b) Co-operation of Territories, States and civil subdivisions thereof may be accepted but shall not be required by the Secretary of Agriculture.

(c) The Secretary of Agriculture may enter into contracts with any Territory, State or civil subdivision thereof for the construction, reconstruction or maintenance of any forest road or trail or part thereof.

(d) Construction work on forest roads or trails estimated to cost \$5,000 or more per mile, exclusive of bridges, shall be advertised and let to contract.

If such estimated cost is less than \$5,000 per mile, or if, after proper advertising, no acceptable bid is received, or the bids are deemed excessive, the work may be done by the Secretary of Agriculture on his own account; and for such purpose the Secretary of Agriculture may purchase, lease, hire, rent or otherwise obtain all necessary supplies, materials, tools, equipment and facilities required to perform the work.

The appropriation made in this section or that may hereafter be made for expenditure under the provisions of this section may be expended for the purpose herein authorized and for the payment of wages, salaries and other expenses for help employed in connection with such work.

SEC. 24. That in any State where the existing constitution or laws will not permit the State to provide revenues for the construction, reconstruction or maintenance of highways, the Secretary of Agriculture shall continue

to approve projects for said State until three years after the passage of this Act, if he shall find that said State has complied with the provisions of this Act in so far as its existing constitution and laws will permit.

SEC. 25. That if any provision of this Act, or the application thereof to any person or circumstances, shall be held invalid, the validity of the remainder of the Act and of the application of such provision to other persons or circumstances shall not be affected thereby.

SEC. 26. That all Acts or parts of Acts in any way inconsistent with the provisions of this Act are hereby repealed, and this Act shall take effect on its passage.

Approved, November 9, 1921.

RULES AND REGULATIONS OF THE SECRETARY OF AGRICULTURE FOR CARRYING OUT THE FEDERAL HIGHWAY ACT (EXCEPT THE PROVISIONS THEREOF RELATIVE TO FOREST ROADS).

REGULATION 1. DEFINITIONS

SECTION 1. For the purposes of these regulations, the following terms shall be construed, respectively, to mean:

ACT. The Act of Congress approved July 11, 1916, entitled "An Act to provide that the United States shall aid the States in the construction of rural post roads, and for other purposes" (30 Stat., 355), as amended by the Act of Congress approved February 28, 1919, entitled "An Act making appropriations for the service of the Post Office Department for the fiscal year ending June 30, 1920, and for other purposes" (40 Stat., 1200, 1201), and as amended by the Act of Congress approved November 9, 1921, entitled "An Act to amend the Act entitled 'An Act to provide that the United States shall aid the States in the construction of rural post roads, and for other purposes,' approved July 11, 1916, as amended and supplemented, and for other purposes" (Public, No. 87, 67th Congress).

Secretary. The Secretary of Agriculture of the United States.

Bureau of Public Roads. The Bureau of Public Roads of the United States Department of Agriculture.

Authorized Representatives of the Secretary. The Chief of the Bureau of Public Roads and such other officials and employees thereof as he may designate from time to time.

Federal Aid Highway System. The system of Federal Aid highways, established by actual agreement and joint action of the States and the Secretary of Agriculture, and upon which all Federal aid funds shall be spent.

Primary Highways. The primary or interstate portion of the Federal Aid highway system composed of not to exceed $\frac{3}{4}$ thereof.

Secondary Highways. The secondary or intercounty portion of the Federal Aid highway system consisting of at least $\frac{1}{4}$ thereof.

Ten Per Cent Fund. Items for engineering, inspection, and unforeseen contingencies, not exceeding 10 per cent of the total estimated cost of the construction.

REGULATION 2. APPLICATION OF REGULATIONS

SECTION 1. These regulations apply to all provisions of the Act, except the provisions thereof relative to forest roads and trails, unless hereafter so made applicable by order of the Secretary.

SEC. 2. These regulations shall apply as fully where the extent to which the State may engage in road construction and maintenance work, or raise state revenues therefor, is limited by its existing constitution and laws as in any other case.

REGULATION 3. INFORMATION FOR THE SECRETARY

SECTION 1. Before any agreement is made upon any road or roads to be constructed in a State, or as to the character and method of construction, there shall be furnished to the Secretary upon his request, by or on behalf of the State, general information as to its laws affecting roads and the authority of the State and local officials in reference to the construction and maintenance of roads; as to the State Highway Department, how equipped and organized; as to the existing provisions of its constitution or laws relative to State revenues for the construction, reconstruction, or maintenance of roads; as to funds that will be available to meet the State's share of the cost of the construction work to be performed and the general source of such funds; and as to provisions made, or to be made, for maintaining roads upon which Federal Aid funds will be expended.

SEC. 2. Information requested by the Secretary or his authorized representatives relating to the maintenance of roads constructed under the provisions of the act shall be furnished, from time to time, by the State highway departments, on forms supplied by the Bureau of Public Roads.

SEC. 3. Data furnished by or on behalf of a State shall be supplemented by such reports of the Bureau of Public Roads as the Secretary may from time to time require.

REGULATION 4. FEDERAL AID HIGHWAY SYSTEM MAP

SECTION 1. Each State highway department shall file with the Secretary of Agriculture a state map showing the proposed Federal Aid Highway system and indicating the primary and the secondary portions thereof, in such form and with such information as he may require.

SEC. 2. The Secretary, through his authorized representatives, will make an examination of the proposed system and will from time to time notify the State Highway Department of the acceptability of the parts of the system examined.

SEC. 3. When agreement has been reached between the State Highway Department and the Secretary as to the whole (or if the State so desires, of a material portion) of the Federal Aid highway system, the State shall make formal request for the approval of the Secretary of Agriculture. This request will be accompanied by a State map showing the full proposed Federal Aid highway system with the primary and secondary high-

ways upon which formal approval is requested, in such form and with such information as may be prescribed by the Secretary or his authorized representatives.

SEC. 4. Pending the formal approval of the State highway system in whole or in part by the Secretary of Agriculture, only such projects will be approved as are on routes indicated on the proposed Federal Aid highway system as submitted under Section 1 and tentatively accepted by the Secretary under Section 2 of this Regulation; *Provided*, That the Secretary of Agriculture may approve project statements submitted by the State highway departments prior to the selection, designation, and approval of the system of Federal aid highways herein provided for if he may reasonably anticipate that the projects will become a part of such system.

REGULATION 5. PROJECT STATEMENTS

SECTION 1. A project statement may be submitted for the whole or any part of a continuous route or routes embraced in the Federal Aid highway system selected or designated in accordance with the provisions of the act, preference being given to such projects as will expedite the completion of a system of highways interstate in character.

SEC. 2. Prior to the selection, designation, and approval of the Federal Aid highway system, project statements may be submitted for any route or part of a route if the Secretary may reasonably anticipate that such route will become a part of such system. After the Federal Aid highway system shall have been selected, designated and approved no project statements shall be submitted for any route or part of a route not embraced in the system so selected, designated and approved.

SEC. 3. A project statement shall contain such information as the Secretary may require to be submitted on a form supplied by the Bureau of Public Roads and shall be accompanied by a sketch map in sufficient detail and covering such length of road as may be necessary to determine the fitness of the location as a part of the Federal Aid Highway system and with the termini of the proposed improvement indicated thereon.

REGULATION 6. SURVEYS, PLANS, SPECIFICATIONS AND ESTIMATES

SECTION 1. The surveys, plans, specifications and estimates shall show in convenient form and detail the work to be performed, and the probable cost thereof, all in conformity with the standards governing form and arrangement prescribed by the Secretary.

SEC. 2. Copies of the specifications shall be submitted with the plans and estimates, except that where standard specifications have been approved by the Chief of the Bureau of Public Roads a statement to the effect that approved standard specifications govern may be submitted in lieu of the printed documents.

SEC. 3. Until plans, specifications, and estimates for a project or part thereof have been submitted and found satisfactory for recommendation, and the State has been so notified by the District Engineer of the Bureau of Public Roads, no project or part thereof shall be let to contract.

SEC. 4. The estimate for each project shall show the estimated quantity and the estimated cost of each item of construction in detail and, separately, the 10 per cent fund, and shall not include any expense for advertising.

SEC. 5. Unless State standard contract and bond forms have been approved there shall be submitted with each set of plans for the approval of the Secretary copies of the form of contract together with all documents referred to therein or made a part thereof, and of the contractor's bond which it is proposed to use on the project. No alteration of either of these forms, when once approved, shall be made until it is approved by the Secretary.

SEC. 6. Where any part of the cost of a project is to be furnished by a county or other local subdivision or subdivisions of a State, the plans, specifications, and estimates shall be accompanied by certified copy of each resolution or order, if any, of the appropriate local officials, or such other showing as the Secretary may require respecting the funds which are made available, or respecting the supervision of the construction of the road and of the control of the money provided for paying such cost.

SEC. 7. Right-of-way ample for any project shall be provided and no incidental damages to adjoining property, due to construction work paid for by or on behalf of the State, shall be included in the estimate or be paid in any part, directly or indirectly, by the Federal Government.

REGULATION 6

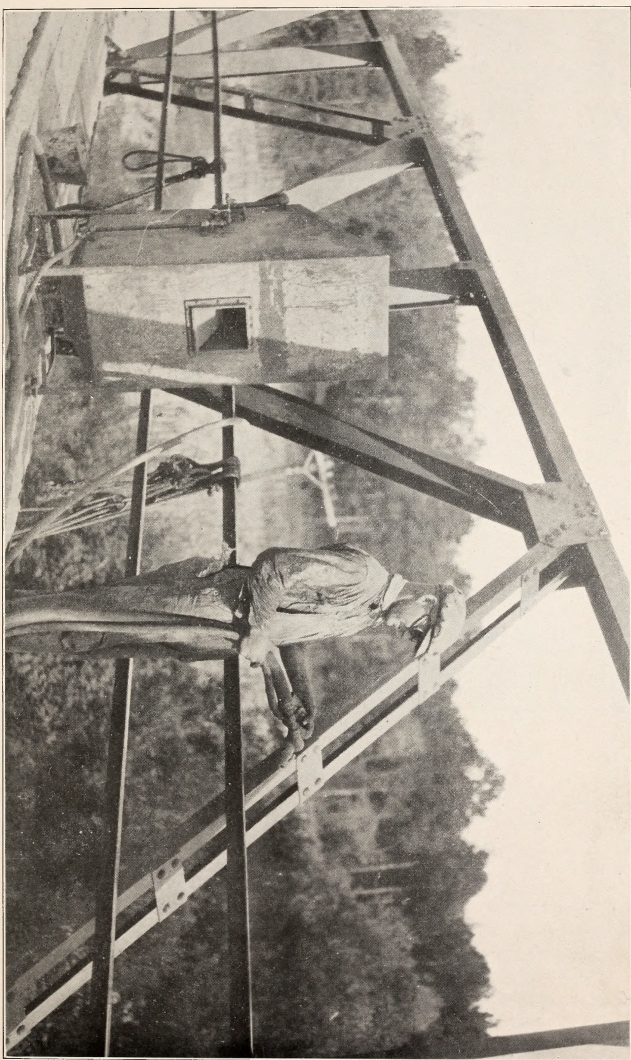
SEC. 8. Grade crossings occurring on the Federal Aid Highway System shall be classified for priority of improvement by agreement between the State Highway Departments and the Bureau of Public Roads.

SEC. 9. No part of the expense of making surveys, plans, specifications, or estimates, by or on behalf of the State prior to the beginning of construction work, shall be included in the estimate or paid by the Federal Government.

SEC. 10. Subsequent to the execution of the agreement no change which will increase the cost of a project to the Federal Government shall be made, except upon approval by the Secretary of Agriculture, and no changes shall be made in the termini or type, except upon approval of the Chief of the Bureau of Public Roads, but minor alterations which do not affect the general nature of the improvement or increase the total cost to the Federal Government may be authorized by the Chief of the Bureau of Public Roads or his authorized representative.

REGULATION 7. PROJECT AGREEMENTS

SECTION 1. A project agreement between the State Highway Department and the Secretary shall be executed in triplicate on a form furnished by the Secretary. No payment shall be made by the United States unless or until such agreement has been executed, nor on account of work done prior to recommendation by the District Engineer of the Bureau of Public Roads that the plans, specifications and estimates be approved.



CLEANING BRIDGE WITH SAND BLAST PREPARATORY TO PAINTING

REGULATION 8. CONTRACTS

SECTION 1. No part of the Federal money set aside on account of any project shall be paid until it has been shown to the satisfaction of the Secretary that adequate methods, either advertising or other devices appropriate for the purpose, were employed, prior to the beginning of construction, to insure economy and efficiency in the expenditure of such money.

SEC. 2. Upon publication of advertisements copies thereof shall be furnished to the Bureau of Public Roads.

SEC. 3. Bids shall conform to the standard proposal form, and the items shall be the same as those contained in the estimate provided for in Regulation 6, Section 4.

SEC. 4. Copy of the tabulated bid prices, showing the unit prices and the totals of each bid for every project, shall be furnished promptly to the Bureau of Public Roads.

13 - SEC. 5. In advance of the acceptance of any bid sufficient notice of the time and place the contract is to be awarded shall be given to the Bureau of Public Roads to enable it, if it so desires, to have a representative present. When a bid has been accepted prompt notice thereof shall be given to the Bureau of Public Roads.

SEC. 6. If the contract be awarded to any other than the lowest responsible bidder the Federal Government shall not pay more than its pro rata share of the lowest responsible bid, unless it be satisfactorily shown that it was advantageous to the work to accept the higher bid.

SEC. 7. The specifications and plans shall be made a part of the contract.

SEC. 8. A copy of each contract, as executed, shall be promptly certified by the State Highway Department and furnished to the Secretary and no alteration in the contract shall be subsequently made without the approval of the Secretary.

REGULATION 9. CONSTRUCTION

SECTION 1. Suitable samples of materials to be used in construction work shall be submitted, by or on behalf of the State Highway Department, to the Bureau of Public Roads whenever requested.

SEC. 2. Unless otherwise stipulated in writing by the Secretary or his authorized representative, materials for the construction of any project shall be tested, prior to use, for conformity with specifications, according to methods prescribed or approved by the Bureau of Public Roads.

SEC. 3. No part of the money apportioned under the act shall be used, directly or indirectly, to pay or to reimburse a State, county, or local subdivision for the payment of any premium or royalty on any patented or proprietary material, specification, process, or type of construction unless purchased or obtained on open actual competitive bidding at the same or a less cost than unpatented articles or methods, if any, equally suitable for the same purpose.

SEC. 4. The supervision of each project by the State Highway Department shall include adequate and continuous engineering inspection throughout the course of construction.

SEC. 5. Written notice of commencement and completion of work on any project shall be given promptly by the State Highway Department to the Bureau of Public Roads.

SEC. 6. Reports of the progress of construction, showing force employed and work done, shall be furnished as requested by the Secretary or his authorized representatives.

REGULATION 10. RECORDS AND COST KEEPING

SECTION 1. Such records of the cost of construction, of inspection, of tests, and of maintenance, done by or on behalf of the State, shall be kept, by or under the direction of the State Highway Department, as will enable the State to report, upon the request of the Secretary or his authorized representatives, the amount and nature of the expenditure for these purposes.

SEC. 2. The accounts and records, together with all supporting documents, shall be open at all times to the inspection of the Secretary or his authorized representatives, and copies thereof shall be furnished when requested.

REGULATION 11. PAYMENTS

SECTION 1. Vouchers, in the form provided by the Secretary and certified as therein prescribed, showing amounts expended on any project and the amount claimed to be due from the Federal Government on account thereof, shall be submitted by the State Highway Department to the Bureau of Public Roads, either after completion of construction of the project, or, if the Secretary has determined to make payments as the construction progresses, at intervals of not less than one month.

REGULATION 12. SUBMISSION OF DOCUMENTS

SECTION 1. Papers and documents required by the act or these regulations to be submitted to the Secretary may be delivered to the Chief of the Bureau of Public Roads or his authorized representatives and, from the date of such delivery, shall be deemed submitted.

PART II

Departmental Reports



TOPSOIL ROAD IN STANLY COUNTY—ROUTE 74

Departmental Reports

LEGAL DEPARTMENT

The reorganization of the Commission under the provisions of the 1921 law effected the organization of the above department. Since that time the following transactions have been carried out or are pending:

Number letters written.....	694
Number damage claims filed.....	47
Number damage claims closed.....	17
Number damage claims pending.....	30
Number suits entered.....	30
Number suits closed.....	14
Number suits pending.....	16
Number arrests of men in construction forces.....	16
Number of contracts written.....	63
Number condemnations	6
Number deeds written.....	6
Number cases on appeal, Supreme Court.....	2
Number drainage districts begun.....	2
Number drainage districts completed.....	1

It will be observed from the foregoing that the greater amount of work in this department has arisen from alleged damages for rights-of-way necessary in highway construction. It is fair to the freeholders of North Carolina, however, to state that in the majority of instances the necessary rights-of-way for new locations have been secured without difficulty and without claims for damages, the owners taking the position that the benefits accruing to their lands from the construction of a modern highway more than compensated for the land taken for right-of-way. This attitude, without a doubt, discloses an unmistakable sentiment in favor of the good-roads program now being prosecuted by the State Highway Commission.

It will be observed, further, that only two controversies have been carried to the Supreme Court. The Jennings case, appealed from Pasquotank, fixed the right of the State Highway Commission, as State agency, to go upon private property and acquire material for road building purposes. In this case, the State Highway Commission was restrained by a temporary order, and which order, upon the final hearing, was vacated. The Supreme Court confirmed the action of Judge Horton, in his position, as indicated above.

The other case on appeal to the Supreme Court was that of *Carpenter vs. State Highway Commission*, from Gaston, and in which the Court held that the State Highway Commission, as an agency of the State, was not suable for tort. These two cases, have done much towards removing possible hindrances in the future operations of the State Highway Commission.

The now famous "Orange County Case" was not carried to the Supreme Court, but Judge Kerr held that the discretion, with respect to the location of roads, was lodged in the State Highway Commission and that in the performance of the functions of locating, constructing and maintaining the State Highways, the courts could not interfere unless there had been an abuse of discretion, for to do so would be foreign to the purpose for which courts were created.

PURCHASING DEPARTMENT

The Purchasing Department of the State Highway Commission was organized and began operation, on August 1st, 1921. This Department began with a Purchasing Agent at its head, with a Shipping Clerk, an Order Clerk, and a Stenographer, to assist.

The purpose of this Department is to render the best possible service to the State Highway Commission, and, at the same time, to give that service at the least possible cost to the State Highway Commission.

In order to give the best possible service, the Purchasing Department is equipped to furnish information regarding any equipment, supplies or materials that may be needed by any other Department of the Commission; is authorized to order such equipment, materials or supplies, for the use of the State Highway Commission, and, after making such order, to keep behind such purchase, and to see that the same arrives in due time, and in good condition. The Purchasing Department handles all matters relative to the delivery of goods, and also all matters relative to shipments received in damaged condition. Any claims for shortages in shipments to the Commission are handled by the Purchasing Department.

After shipments are received, and their receipt approved by the head of the Department, or the District Engineer, to whom such shipments are made, the invoices are approved by the Purchasing Agent, as to price, and passed to the Auditing Department, where they are ready for payment.

There is on file in the Purchasing Department complete information relative to every commodity that is required by the Commission, which is of great deal of assistance in making purchases.

In order to give the best service at the least cost to the State Highway Commission, the Purchasing Department keeps a complete file of prices of materials and supplies regularly purchased by the Commission, and, by this method, it can be ascertained readily where such materials and supplies may be purchased most economically.

In cases of purchase of other than ordinary and regular supplies, competitive prices are always secured, by which method possibly the greatest saving of all is effected for the Commission.

Thousands and thousands of dollars are being saved the Commission annually by the operation of this Department, in addition to the service rendered in many other ways.



SCENE AT EQUIPMENT DEPOT SHOWING TRUCK SHED

STATE HIGHWAY COMMISSION
Publicity Department
PUBLICATIONS AND STATISTICS

47

56
This department acts in the capacity of an information bureau for persons interested in the work of the Commission and tourists desiring road maps or information in regard to routes and road conditions in this and other States. During the period covered by this report a large amount of information of this nature has been disseminated both by correspondence and by interview with the engineer in charge. ~~Particularly has this been true since the reorganization took place and the State has become so widely known on account of the road program now being carried out.~~ Almost daily requests are received for information and data on State Highway work and photographs showing same. A file of photographs of construction work is kept in this department and prints are available on short notice.

An effective organ in the distribution of data of the nature described above is "The North Carolina Highway Bulletin" which is published by this branch of the Commission. This magazine is mailed to interested parties in this and other States and has been the means of drawing attention to the work in North Carolina.

Information in regard to detours and road conditions on the State Highway System is available in this office and is also mailed to newspapers, hotels, garages, Chambers of Commerce, etc., in the form of a mimeographed report, such report being issued ~~as often as changes in road conditions warrant.~~ *monthly* *prints*

In addition to the above functions this department keeps a complete card record which shows the ~~exact~~ status of each and every project on the State Highway System. This file is used constantly by other departments of the Commission.

During the past two years ~~two~~ exhibits, illustrative of the work of the Commission, were put on at the State Fair. These exhibits created ~~quite a bit of~~ interest in the work of the Commission. *Considerable*

✓ **MOTOR EQUIPMENT DEPOT**

From a small organization composed of the superintendent and a few mechanics, occupying the ball park at Raleigh, this, one of the most important departments of the Highway organization, has grown into an organization made up of the superintendent, an office force, traveling equipment inspectors, mechanics and machinists, numbering in all approximately 150 men. All of the surplus war material which is distributed to the various States by the Bureau of Public Roads, at Washington, is handled by this department and the fact that North Carolina receives her full share of allotted equipment is due largely to the activities of the superintendent of this department. The following inventory shows the amount and value of automotive equipment received to date but does not include repair parts received.

TOURING CARS

174 Fords	\$ 488.00	\$ 84,912.00
12 White Staffs	4,500.00	54,000.00
4 Ford Roadsters	458.00	1,832.00
2 Overlands	500.00	1,000.00
2 Buicks	1,980.00	3,960.00
1 Chandler	1,675.00	1,675.00
1 Nash	1,555.00	1,555.00
1 Cadillac	2,500.00	2,500.00
1 Haynes	1,200.00	1,200.00
1 Packard	2,700.00	2,700.00
109 Dodges	980.00	106,820.00

\$262,154.00

TRUCKS

267 Nash Quads	\$2,750.00	\$734,250.00
201 F. W. D.	4,250.00	854,250.00
77 White 1½-ton	2,400.00	184,800.00
72 Liberties	6,000.00	432,000.00
66 Packards	4,100.00	270,600.00
39 Peerless	4,100.00	159,900.00
32 G. M. C. ¾-ton	1,295.00	41,440.00
31 Heavy Aviation	4,000.00	124,000.00
27 Federal	3,150.00	85,000.00
17 White Recon.	4,000.00	68,000.00
14 Amb. G. M. C.	1,295.00	18,130.00
12 Light Aviation	2,500.00	30,000.00
9 Internationals	2,500.00	22,500.00
9 Fords	493.00	4,437.00
5 Kelly Springfields	4,600.00	23,000.00
5 Pierce Arrows	4,350.00	21,750.00
4 Standards	1,250.00	5,000.00
3 Macks	5,750.00	17,250.00
1 Hulbert	2,000.00	2,000.00
1 Indiana	1,500.00	1,500.00

3,099,807.00

TRACTORS

4 15-ton	\$5,000.00	\$ 20,000.00
6 5-ton	3,500.00	21,000.00
60 10-ton	4,000.00	240,000.00

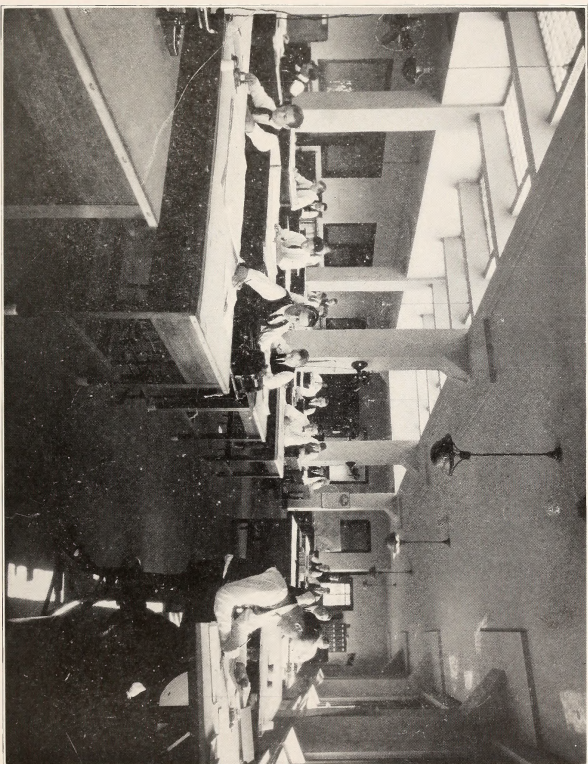
281,000.00

MOTORCYCLES

88 Indians	300.00	26,400.00
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26,400.00

Grand Total\$3,669,261.00



ROAD DEPARTMENT DRAFTING ROOM

Of a total of 1,347 cars, trucks, tractors and motorcycles received, 795 pieces are now in daily service, 533 pieces are in storage and available for service when needed, while the remainder were in such condition when received that they were stripped and the parts salvaged. The equipment which is now in service if purchased by the State would cost \$1,951,963. The total cost of overhauling this equipment and putting it in serviceable condition was \$282,902.24, making a net profit to the State of \$1,669,060.76. This does not include many trucks and cars that have been in service for a year, or fraction thereof, and returned for overhauling and replaced by other equipment. This item above amounts to approximately \$750,000, making a total profit gained by the use of equipment distributed by the government of \$2,411,060.76.

The total valuation of the automotive equipment, motor parts, machinery, buildings, etc., is \$7,669,411. The buildings are constructed for the most part from surplus war material and most of the machinery in use was also received from government allotments. From the above data it will be seen that the operation of this depot is a decided asset to North Carolina.

The work of this department is thoroughly systematized and a completed record, in card form, is kept of each job as it goes through the shop. A thorough inspection is made of the work as it progresses, thus incurring a mechanically perfect job when it is sent on the road. In each district there is maintained a smaller garage in charge of a district mechanic who does minor repair work on the cars used in that district. This has been found to be an economical method since it does away with the necessity of sending the cars to Raleigh and saves a vast amount of time. To insure that the proper care is taken of the cars and trucks by the men in the field, there are several traveling mechanics who travel over the State inspecting the motor equipment.

THE ROADWAY DEPARTMENT

After a proposed road has been definitely surveyed or located, detailed plans and estimates must necessarily be prepared before the work can be let to contract. These plans and estimates are very essential in order that the road may be properly constructed, and that the State Highway Commission may know in advance what it should cost. In addition, they are absolutely indispensable to prospective bidders, in that they give, in accurate and complete detail, all quantities involved and all necessary information needed by the bidder to insure his lowest possible bid for the work. These details, plans, and estimates are prepared according to the standards required by the U. S. Bureau of Public Roads, whether the project is to have the benefit of Federal Aid or not.

On account of the vast and unprecedented volume of work entailed by the huge program successfully carried through during the past two years, it is difficult for the layman to appreciate the amount of work this department is called upon to perform.

In order to handle this work with as much dispatch as possible, and at a minimum of cost, this department is subdivided into three divisions, viz., (1) Drafting Division. (2) Division of Contracts and Contractor's Information. (3) Blue Print Division.

The Drafting Division

The Drafting Division employing a varying number of draftsmen under a chief draftsman, designs and prepares all plans and estimates for the construction of the roadway. The number of draftsmen so employed varies according to the seasonal program of work ahead, ranging from 15 to 30 men.

During the two-year period covered by this report, June 30th, 1920, to June 30th, 1922, the Drafting Division of this department designed and prepared plans and estimates on 210 projects, comprising 1691 miles of road, of which 159 projects covering 1264 miles were prepared during the latter half of this period, the heavy increase being due to the reorganization of this division so as to enable it to handle the larger program made necessary by the fifty-million dollar bond issue authorized by the 1921 Legislature.

In addition to the above output of the drafting division, it has constantly been called upon to perform many miscellaneous duties. It prepared a road map 18" x 23", of each of the 100 counties in the State. It prepared 95 standard designs for typical road sections to cover a multitude of varying types and conditions. It designed a standard for the widening and super-elevation of curves, a method for widening compound curves, one for the elimination of reverse curves, a standard form and requirements for the preparation of final estimates, which has saved the State many thousands of dollars and at the same time has practically eliminated any possibility of a dispute with the contractor as to the amount due him in final settlement for his work. This division performs other miscellaneous duties too numerous and varied to describe here in detail.

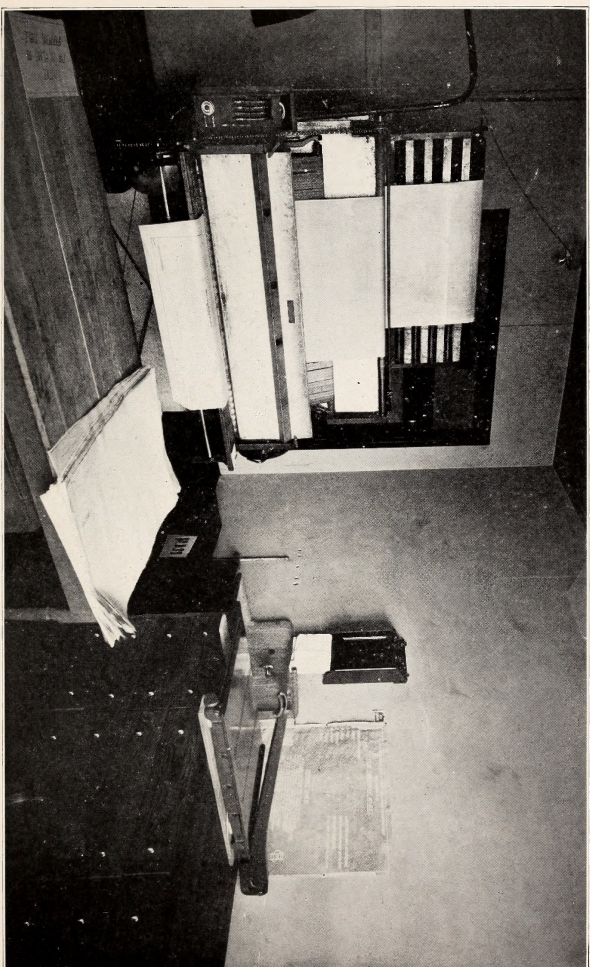
The Division of Contracts and Contractors' Information

This Division is of a semi-technical character, and its duties are numerous and varied. Three men are employed. It prepares the advertisements for all contracts let by the Highway Commission. For each project to be let, it prepares over 700 multigraphed notices setting forth in detail the quantities involved and other pertinent information of interest to contractors and these are mailed to prospective bidders throughout the United States. They are also published in one or two of the leading technical journals.

Contractors desiring to submit bids for the work then make application for the necessary itemized proposal forms, specifications, etc. This division prepares the proposals and sees they reach the interested parties. By these means keen competition between bidders is obtained, as there are usually from 150 to 300 bidders present at each letting.

After the work is awarded this division prepares the contract for final execution. During the period covered by this report it has drawn over 300 contracts and has made six copies of each for the guidance and use of all parties interested therein.

This division also serves as an information bureau for contractors and keeps on display a full set of plans and specifications covering all work to be let, and it endeavors to supply all bidders with such varied information as they may ask for.



BLUE PRINT DEPARTMENT

It mails out blue-prints of bridges and culverts to such parties as are interested and makes a charge of five dollars for each set. From this source it collects from \$100 to \$200 per month, which is turned over to the Auditor.

In addition to the foregoing, this division keeps systematic and useful records of all work handled by it, and it also prepares and keeps up-to-date progress charts which show in colors the monthly progress made on the construction of every project in the State.

From these charts one can visualize at a glance the exact status of the construction, can see the monthly progress, can read, instantaneously, the per cent complete of any job in the State, and can tell what particular phase of the work is lagging behind.

The Blue Print Division

This division is charged with the duty of making all the blue-prints of whatever nature required by the Highway Commission.

On account of the rapid increase in the number of prints required it soon became evident that the Commission should make its own prints, rather than to pay commercial blue-printers for them. Consequently an up-to-date machine costing \$1,800 was installed, a blue-printer and two assistants were employed and they are now turning out from 8,000 to 11,000 prints per month, according to requirements.

During the two years covered by this report, this division has turned out 625,481 square feet of blue prints, or enough to cover a farm of $14\frac{1}{3}$ acres. The total cost of these prints to the Highway Commission was about \$12,510, or two cents per square foot. Had the work been let to private blue-printers, at the current price of four and one-half cents, it would have cost \$28,147. It will be noted that the Commission has thus saved some \$15,637 on blue-prints alone. In other words, during the two-year period this machine has paid for itself nearly nine times, and still greater economy is anticipated for the coming two years on account of the greater output which will be required, so that the net saving for the next two years on blue-prints alone is expected to reach \$24,000.

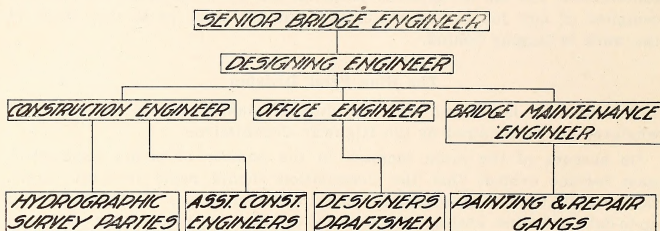
BRIDGE DEPARTMENT

Since our last report the organization of the Bridge Department has been changed in two important details. Formerly all inspection reports and recommendations for bridges and culverts were made by the various District Engineers, acting on the reports submitted by the chief of party locating the road. When the location of the various projects was placed under the Principal Locating Engineer, it was decided that it would be more advantageous and economical to have these hydrographic surveys made directly by this Department. In this way more accurate information in regard to the opening required for any particular drainage area and the foundation conditions could be obtained. This phase of the Department is discussed further on at greater length.

Under the Construction Engineer also comes the inspection of the construction of the various bridges throughout the State. The purpose of this

branch of the Department is to make sure that all construction meet the requirements of our specifications, to standardize all details and to advise with the District Engineers on any special problem that may arise during construction.

The Superintendent of Bridge Construction, as noted in the last report, has been replaced by the Bridge Maintenance Engineer. Due to economic conditions which greatly lowered prices and to the influx of contractors into the State with the resulting competition it was decided, with a few exceptions, that it was more advisable to let all work to private contractors

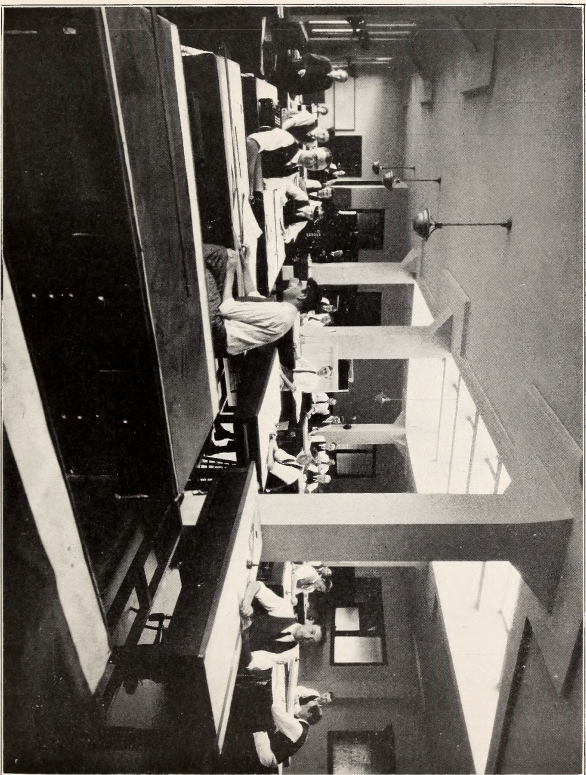


rather than to have it done by the State. As the maintenance of all roads and bridges on the State System of Highways was placed under the direction of the Commission, it was decided to have as much of this work as possible done by this Department. This applies particularly to the repairing and painting of the larger structures which it was not advisable to replace at the present time. This branch of the Department activities is described at greater length further on.

From the above it will be noted that the responsibility and supervision of all structures on the State system of highways, from the making of the preliminary inspection through the preparation of plans, to the construction of the finished bridge now comes under this Department. It is believed that, with this centralized control under one head with no other interests, better results will and, in fact, are being secured.

In order to insure as efficient inspection as possible, especially on large structures, a policy has been adopted according to which the man who designs a special bridge is sent out in the field as resident engineer during construction. In this manner the man most familiar with the plans sees to it that all details are carried out during construction. While this method necessitates the continual breaking in of new men in the office and a slight increase in the cost of preparing plans, it is believed that these possible drawbacks are more than counterbalanced by the incentive offered the designer of seeing the "child of his brain" take actual form and finally become completed. Another advantage gained is the creation of an organization of men familiar with all phases of bridge work who are equally adept both in the office and in the field.

As a result of experiments and to conform to the best modern practice, the weight of the equivalent fluid for which the abutments are designed, has been increased from twenty-one to thirty pounds per cubic foot.



BRIDGE DEPARTMENT DRAFTING ROOM

PLANS

DATE	Class "AA" Concrete Cu. Yds.	Class "A" Concrete Cu. Yds.	Sheet Piling C. Ft. B. C. M.	Untr. Timber Test Piles	Illumin- ating Stand- ards	Grouted Rip Rap Sq. Yds.	Guard Rail Lin. Ft.	Wearing Surface Sq. Yds.
1920								
July.....		816						
August.....		1,169						
September.....		5,027						
October.....		4,977						
November.....		3,804						1,380
December.....		485					1,308	1,329
1921								
January.....		7,314						6,902
February.....								
March.....		1,116						
April.....		4,448						
May.....		2,095						
June.....		1,413						
July.....		2,083						
August.....	16	4,673						294
September.....		8,995						814
October.....		7,683			8			1,294
November.....		6,669						
December.....		6,594						192
1922								
January.....		10,710	15.7			260	1,150	2,224
February.....		8,387			4		462	
March.....		8,262						
April.....	91	8,819		10	6			2,226
May.....	387	7,796		10				786
June.....	110	3,522		2				978
Total.....	604	116,857	15.7	22	18	260	2,920	18,419

CHART SHOWING MONTHLY RECORD OF BRIDGE QUANTITIES FOR CO

FROM JULY 1, 1920, to JULY 1, 1922

DATE	Class "AA" Concrete Cu. Yds.	Class "A" Concrete Cu. Yds.	Class "B" Concrete Cu. Yds.	Class "C" Concrete Cu. Yds.	Cement Rubble Mas. Cu. Yds.	Reinforc- ing Steel Lbs.	Exp. Plates and Bolts, Lbs.	Name Plates	Structural Steel, Lbs.	Machinery Lbs.	Trtd. Struct. Lumber M. Ft. B. M.	Untr. Timber Piling Lin. Ft.	Tr. Timber Piling Lin. Ft.	R. C. Precast Piling Lin. Ft.
1920														
July.....		816		63		83,370	1,070	6				525		
August.....		1,169			593	132,930	1,530	18				840		
September.....		5,027	223	181	436	481,350	7,454	56				3,505		
October.....		4,977				555,410	9,550	58				9,780		
November.....		3,804	23		17	433,805	7,870	42				7,360		
December.....		485	304			31,170		8	418,640		74.0	4,400		
1921														
January.....		7,314	133			1,340,820	42,470	28	195,000	25,000	75.0	6,840	6,400	3,910
February.....														
March.....		1,116	40			112,880	1,780	16				5,520		
April.....		4,448			222	415,050	4,430	34						
May.....		2,095	26		1,341	242,670	3,790	24						
June.....		1,413	16			184,970	3,240	12				2,760		
July.....		2,083	23	23		199,275	1,414	10				1,410		
August.....	16	4,673	816	87	654	517,230	4,630	36	112,500		14.8	2,820		
September.....		8,995	235	64	2,173	985,150	11,330	58	186,200		14.8	17,030		
October.....		7,683	238			877,600	12,510	56	186,200		37.9	13,350	545	
November.....		6,669	38	254	2,756	823,176	12,664	54				9,180		
December.....		6,694			616	640,060	4,970	62	237,230			12,180		
1922														
January.....		10,710	967	30		1,448,840	21,970	52	74,450			8,080	4,260	
February.....		8,387				904,450	10,340	60				9,150		

CHART SHOWING MONTHLY RECORD

HYDROGRAPHIC SURVEY

With the inauguration of the present road building program it was decided that the best results could be secured by having all recommendations for drainage structures made by Hydrographic Survey Parties. This led to the establishment of the Hydrographic Survey, a branch of the Bridge Department, in April, 1922. The organization, equipment, methods of procedure and the results obtained are as given below:

Organization

The Hydrographic Survey comes directly under the Bridge Engineer, details of the work being handled by his construction engineer. There are two field parties (three, when necessary), each consisting of a chief of party and one rodman. When needed for heavy foundation investigation work, local day labor is employed. This is a small item of the cost of the surveys.

Equipment

Each party has a car, the necessary instruments for making whatever survey is required and tools for taking borings for foundations. There is also a truck fitted out with a complete wash boring rig, for taking borings beyond the scope of the hand tools.

In making the survey, every possible drainage opening, whether pipe, culvert or bridge, has to be investigated. The size and character of each drainage area have to be carefully noted, high water marks and the rate of flow obtained, all other drainage structures in the vicinity under highways or railroads measured and their adequacy determined as nearly as possible, borings taken to develop the rock line or character of subfoundation, and the local peculiarities of each watershed and the location of each structure, as well as the characteristics of the general locality, have to receive careful consideration.

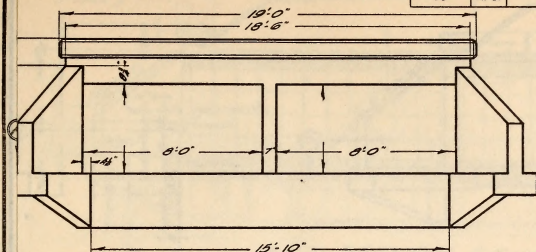
On large and important structures a much more extensive study is made of the stream and the location for the structure, the rainfall and runoff reports published by the government being used, as are similar data from other sources. The size of each opening is then determined and notes made as a guide to selecting the most suitable type of structure to design in each case. When this is done the list of structures recommended is discussed with the District Engineer and his approval secured. The recommendations are then carefully checked in the Bridge Department office and are ready for the Bridge Designing Engineer and for the Road Department, for noting on the road plans and for adjusting grades over the bridges and culverts.

Results of Survey

Many of the results of the hydrographic survey are intangible and cannot be statistically shown or exactly defined, but the far smaller number of plan revisions with the vastly increased mileage of road work indicates that structures are being proportioned to fit the waterways. This alone, apart from the saving effected by eliminating the duplication of work caused by resurveys and plan revisions, is more than sufficient to justify the existence and continuation of this work. Resurveys have been very few on the hydrographic survey and have usually been required because of line revisions after the hydrographic survey was made. Following is shown in tabulated form the results of this survey for the period from April 16th, to June 30th, 1922. inclusive.

1922 Month	No. of Pro- jects	Total Mileage	No. Struc- tures Under 20-foot Span	No. Struc- tures Over 20-foot Span	Total Length of Structures	Average No. Feet Struc- tures Per Mile	No. of Men	Cost of Surveys	Cost of Structures		Cost of Surveys as Per Cent Cost of Structures		Average Cost Structures Per Mile	Av. Cost of Surveys Per Mile
									Estimated	Contract Price	Estimate	Contract		
Half Month														
April	5	45,288	40	4	1,054	23.27	2 1-2	\$ 353.39	\$ 151,460.89	\$ 134,354.02	0.233	0.263	\$ 2,964.45	\$ 7.80
May	13	114,673	59	15	2,013	17.55	5	983.27	235,900.01	241,712.40	0.384	0.407	2,107.84	8.57
June	14	129,193	123	24	3,248	25.14	6	1,186.49	472,394.75	455,852.63	0.251	0.290	3,528.46	9.18
Totals	32	289,154	222	43	5,315			2,523.15	879,755.74	831,819.05				
Monthly Av.	12.8	115,662	88.8	17.2	2,526	21.84	5.4	\$1,009.26	\$ 351,901.30	\$ 332,727.62	0.286	0.202	\$ 2,876.73	\$ 8.73

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
10	N. C.			



END ELEVATION

DESIGN DATA:

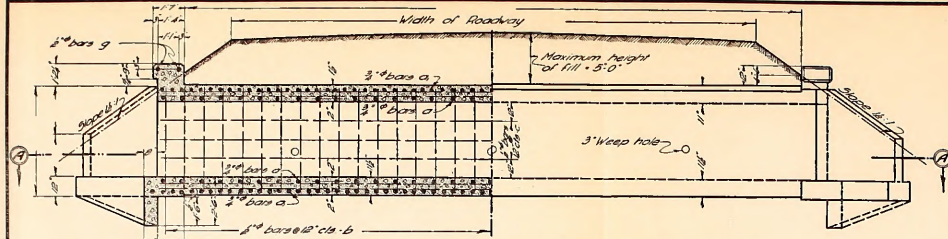
Specifications N.C. State Highway Commission.
 Assumed live load Two typical 15 ton trucks passing
 Maximum height of fill 5'0"
 Weight of fill 100 lbs per cu ft
 Steel in tension 16,000 lbs per sq in
 Concrete in compression 6,500 lbs per sq in
 Concrete in shear 40 lbs per sq in
 Net areas of bars used as follows:
 $\frac{1}{2}$ " = 0.156 sq in
 $\frac{3}{4}$ " = 0.250 sq in
 $1\frac{1}{4}$ " = 0.442 sq in

GENERAL NOTE:

Class A concrete to be used throughout. Proportions 1:2:4.
 All reinforcing steel shall be deformed bars. Square twisted bars are not to be considered as deformed bars. Where splicing of bars is necessary they are to be lapped 40 diameters. All reinforcing steel shall be positively secured against displacement from its correct position by means of approved metal slab bar spacers and ties; see drawing showing typical details. All dimensions relative to reinforcement are to centers of bars.
 Exposed surfaces of curbs and wingwalls are to be brushed out with stiff bristle or wire brushes. No cement wash will be permitted. All corners shall be chamfered 1".
 All material and workmanship as per specifications of the N.C. State Highway Commission.

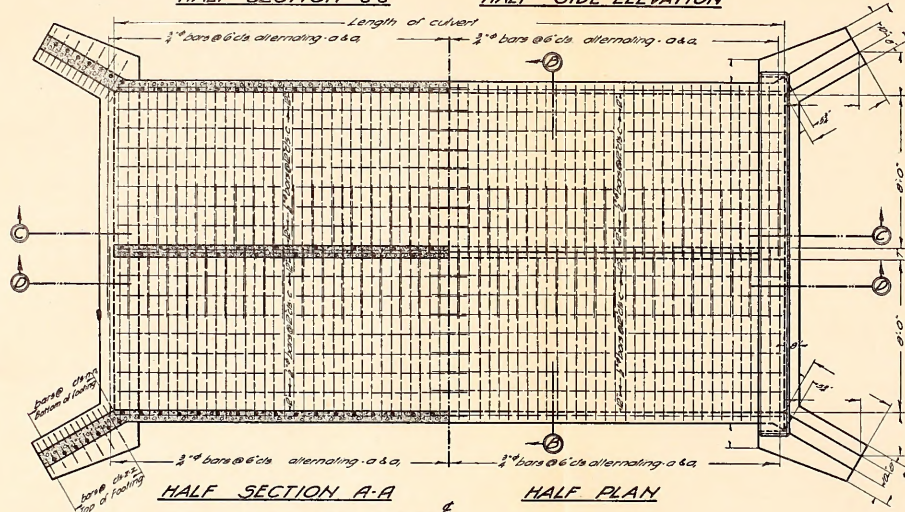
BILL OF MATERIAL				
DOUBLE 8'0" CULVERT				
LENGTH OF CULVERT				
Bar	No	Size	Length	Weight
a	3	3/8"	9'0"	
a		3/8"	12'9"	
b		1/2"		
c		1/2"		
d	4	1/2"	10'9"	50
e		1/2"		
f		1/2"		
g		1/2"		
h		1/2"		
i		1/2"		
j		1/2"		
k		1/2"		
l		1/2"		
m		1/2"		
n		1/2"		
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1922 Month	No. of Pro- jects	Total Mileage	No. Struc- tures Under 20-foot Span	No. Struc- tures Over 20-foot Span	Total Length of Structures	Average No. Feet Struc- tures Per Mile	No. of Men	Cost of Surveys	Cost of Structures		Cost of Surveys as Per Cent Cost of Structures		Average Cost Structures Per Mile	Av. Cost of Surveys Per Mile
									Estimated	Contract Price	Estimate	Contract		
Half Month														
April	5	45,288	40	4	1,054	23.27	2	\$ 353.39	\$ 151,460.89	\$ 134,354.02	0.233	0.293	\$ 2,964.45	\$ 7.80
May	13	114,673	59	15	2,013	17.55	5	983.27	255,900.01	241,712.40	0.384	0.407	2,107.84	8.57
June	14	129,193	123	24	3,248	25.14	6	1,186.49	472,394.75	455,862.63	0.251	0.260	3,528.46	9.18
Totals	32	289,154	222	43	5,315			2,523.15	879,755.74	831,819.05				
Monthly Av	12.8	115,662	88.8	17.2	2,528	21.84	5.4	\$1,009.26	\$ 351,901.30	\$ 332,727.62	0.286	0.292	\$ 2,876.73	\$ 8.73



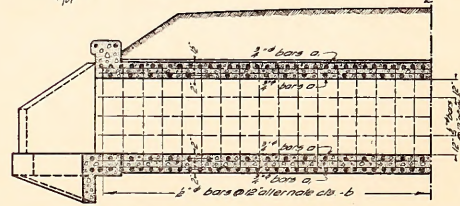
HALF SECTION C-C

HALF SIDE ELEVATION

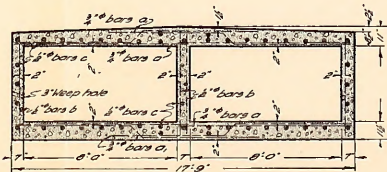


HALF SECTION A-A

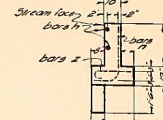
HALF PLAN



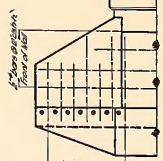
HALF SECTION D-D



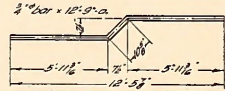
SECTION OF BARREL B-B



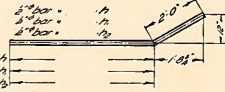
END OF WING



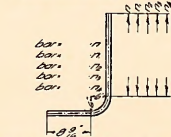
ELEVATION OF WING
SHOWING REINFORCEMENT



DETAIL OF BARS a



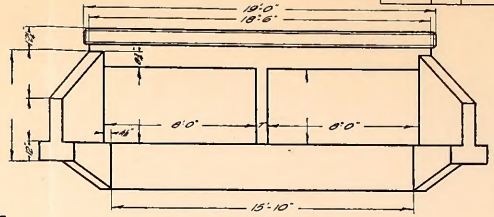
DETAIL OF BARS b, b, b, c



DETAIL OF BARS d, d, e



DETAIL OF BARS e, e, e



END ELEVATION

DESIGN DATA:

Specifications
Assumed live load
Maximum height of fill
Weight of fill
Steel in tension
Concrete in compression
Concrete in shear
Net area of bars used as follows:
1/4" = 0.196 sq.in.
3/8" = 0.280 sq.in.
1/2" = 0.442 sq.in.

GENERAL NOTE:

Class A concrete to be used throughout. Proportions 1:2:4.
All reinforcing steel shall be deformed bars. Square twisted bars are not to be considered as deformed bars. Where splitting of bars is necessary they are to be lapped 40 diameters. All reinforcing steel shall be positively secured against displacement from its correct position by means of approved metal stud bar spacers and ties, see drawing showing typical details. All dimensions relative to reinforcement are to centers of bars.
Exposed surfaces of curbs and wingwalls are to be brushed out with stiff bristle or wire brushes. No cement wash will be permitted. All corners shall be chamfered 1".
All material and workmanship as per specifications of the N.C. State Highway Commission.

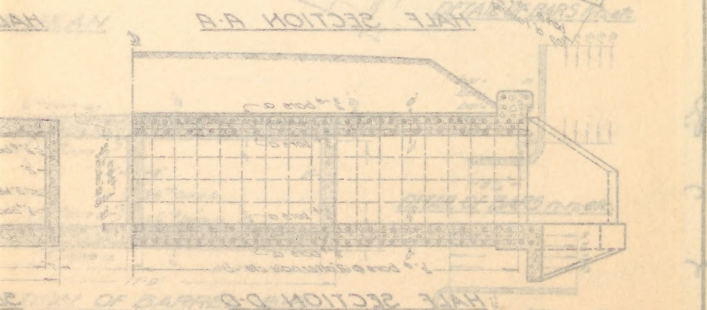
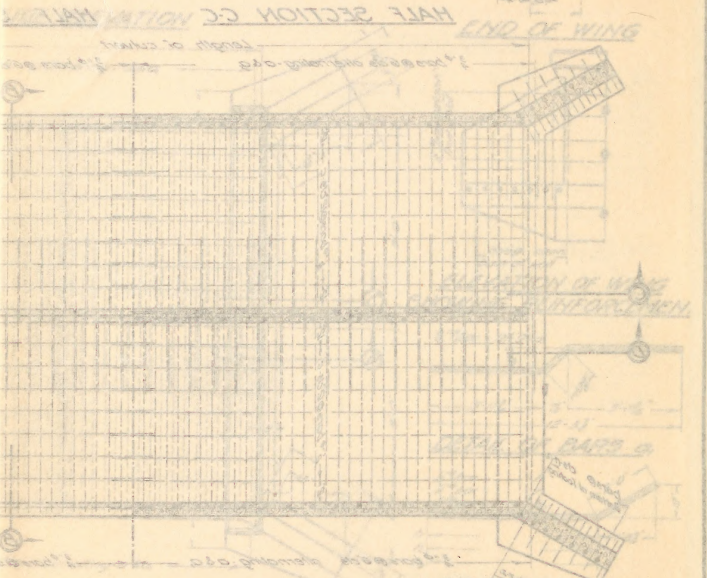
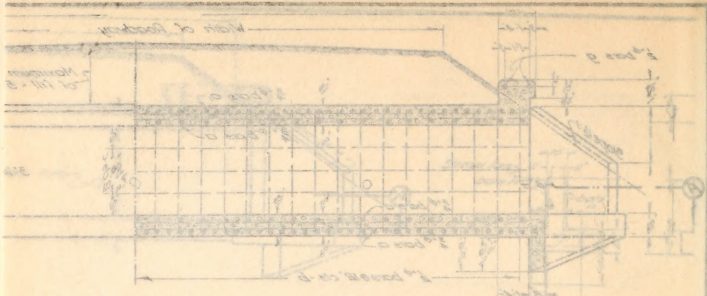
BILL OF MATERIAL				
DOUBLE 8'-0" CULVERT				
Bar	Qty	Size	Length	Weight
1	1	3/4"	9'-0"	
2	2	3/4"	12'-0"	
3	1	3/4"	12'-0"	
4	2	3/4"	12'-0"	
5	4	3/4"	18'-0"	50
6	1	3/4"	12'-0"	
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100	1	3/4"	12'-0"	

PROJECT NO. _____
COUNTY _____

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
STANDARD
DOUBLE 8'-0" x
REINFORCED CONCRETE
BOX CULVERT
SEPTEMBER 1922

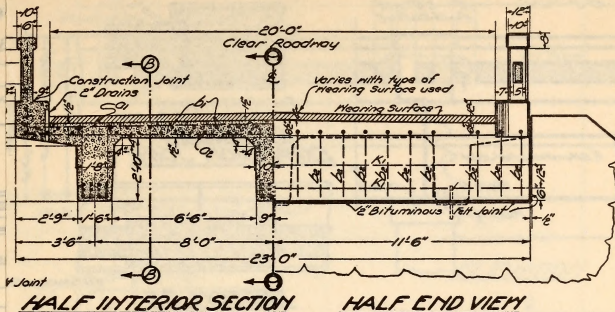
DESIGNED BY T. L. G. ...
APPROVED BY ...
STANDARD NO. 1010

SPECIAL	APPROVED BY	DATE
STANDARD



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1988	1	2	3
1989	1	2	3
1990	1	2	3
1991	1	2	3
1992	1	2	3
1993	1	2	3
1994	1	2	3
1995	1	2	3
1996	1	2	3
1997	1	2	3
1998	1	2	3
1999	1	2	3
2000	1	2	3

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
10	N. C.			



DESIGN DATA

Specifications
Assumed Live Load
Impact Allowance
Wearing Surface
Steel in Tension
Concrete in Compression

This design is based on the net area of bars as follows:
 $6'' \times 0.196 \text{ sq. in.}$ $6'' \times 0.250 \text{ sq. in.}$ $1'' \times 1.000 \text{ sq. in.}$ $16'' \times 1.266 \text{ sq. in.}$

N.C. State Highway Commission
 2 Typical 15 ton Trucks passing.
 30% of Live Load.
 Not to exceed 50 lbs. per sq. ft.
 16000 lbs. per sq. in.
 650 lbs. per sq. in.

GENERAL NOTE

Class A concrete to be used in slab girders and curbs. Proportions 1:2:4.
 Class AA concrete to be used in hand rails above top of curbs. Proportions 1:1:3.
 All reinforcing steel shall be deformed bars. Square twisted bars are not to be considered as deformed bars.

All dimensions relative to reinforcement are to centers of bars.
 No splices of bars other than those shown on plans will be permitted.
 All reinforcing steel to be securely held in correct position by means of approved metal slab bar spacers, hy-chairs, beam saddles, separators, and bar-ty's. See plan showing typical details.

The girders, slab and curbs must be poured at the same time allowing no time for initial set to take place between them. Construction Joints permitted only at top of curbs.

Camber to be $\frac{3}{8}$ of center of span for single span bridges. For multiple span bridges see Camber Diagram.

The name plates to be placed on the bridge, one on the inside of each right hand post approaching bridge. The corresponding panel in post to be omitted. All corners to be chamfered.

Unless otherwise stated under Special Provisions the wearing surface is to be laid by the Road Contractor. The Engineer shall make certain that the top of floor slab is of the correct elevation for type of surfacing used.

All materials and workmanship as per standard Specifications of the N.C. State Highway Commission.

PROJECT NO. _____
 COUNTY _____

MATERIAL SPANS

Length	Height
24'-0"	
22'-6"	
19'-3"	
22'-0"	
39'-0"	
35'-0"	
30'-6"	
24'-6"	
36'-9"	
6'-9"	
20'-9"	
19'-3"	
22'-6"	
17'-0"	
4'-9"	
3'-9"	
9'-1'-Lbs.	
4'-9'-Lbs.	
1'-Lbs.	

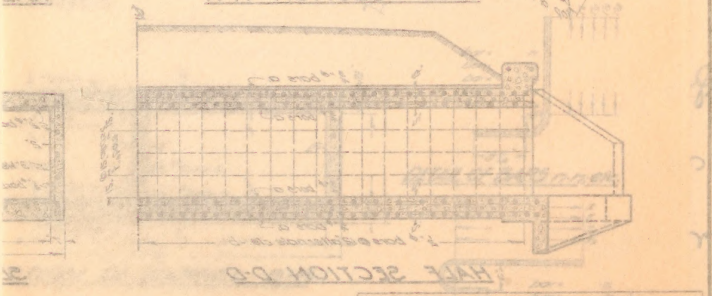
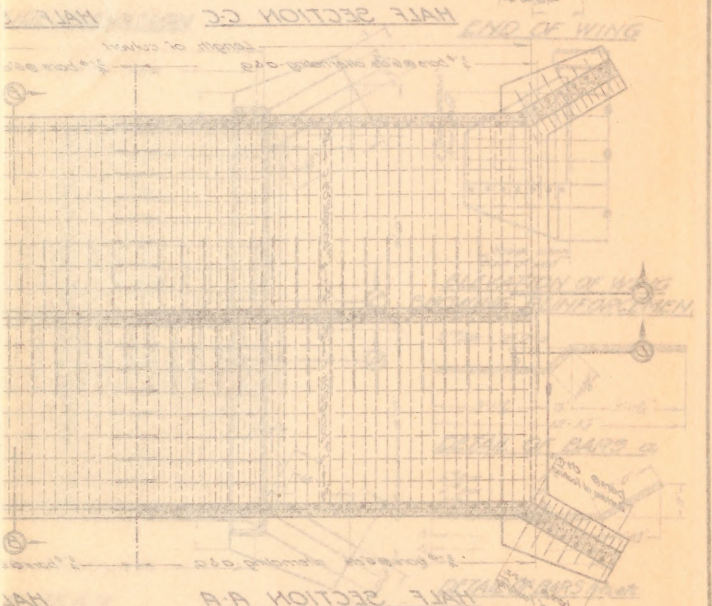
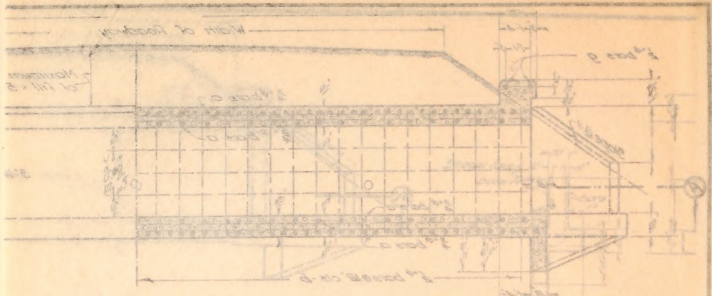
BILL OF MATERIAL ONE SPAN

Bar	No.	Size	Length	Height
a	74	6"	24'-0"	1510
a ₂	74	6"	22'-6"	1415
b	44	6"	19'-3"	566
b ₂	40	6"	22'-0"	588
c	6	7"	39'-0"	796
c ₁	6	7"	35'-0"	714
c ₂	6	7"	30'-6"	622
c ₃	6	7"	24'-6"	500
d	12	16"	36'-9"	2001
e	58	6"	6'-9"	262
f	20	6"	20'-9"	277
h	—	6"	—	—
k ₁	4	6"	22'-6"	77
k ₂	—	6"	—	—
m	—	6"	—	—
s	126	6"	8'-3"	884
Reinforcing Steel-Lbs. 10212				
Class AA Concrete-Cu Yds. 47				
Class A Concrete-Cu Yds. 43.7				
Plates & Bolts-Lbs. 134				

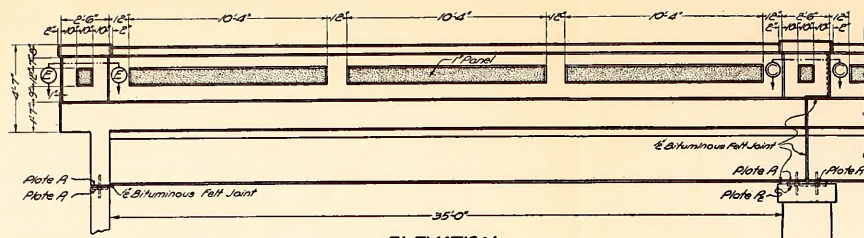
STATE OF NORTH CAROLINA
 STATE HIGHWAY COMMISSION
 BALTIMORE
STANDARD
REINFORCED CONCRETE
DECK GIRDER
 35'-0" SPAN 20'-0" ROADWAY
 MAY 1922 SCALE $\frac{3}{8} = 1'-0"$

SUBMITTED BY *W. L. Craven* BRIDGE ENGR.
 APPROVED BY *Chas. Upham* DATE 5/13/22 STATE HIGHWAY ENGINEER

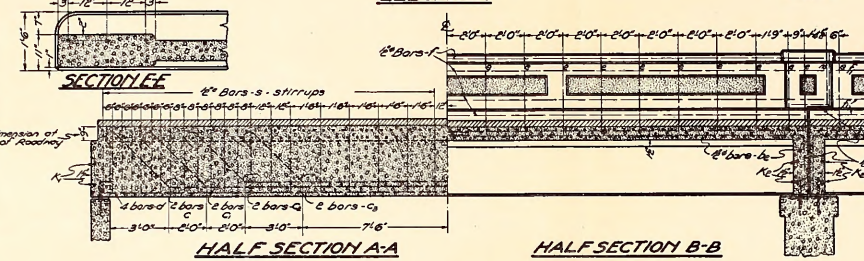
PLAN NO. _____



STANDARD	GRADUATE	EXPERIENCED	ARCHITECT
1. To prepare and execute all drawings and specifications for the construction of buildings and other structures.	2. To prepare and execute all drawings and specifications for the construction of buildings and other structures.	3. To prepare and execute all drawings and specifications for the construction of buildings and other structures.	4. To prepare and execute all drawings and specifications for the construction of buildings and other structures.
5. To prepare and execute all drawings and specifications for the construction of buildings and other structures.	6. To prepare and execute all drawings and specifications for the construction of buildings and other structures.	7. To prepare and execute all drawings and specifications for the construction of buildings and other structures.	8. To prepare and execute all drawings and specifications for the construction of buildings and other structures.
9. To prepare and execute all drawings and specifications for the construction of buildings and other structures.	10. To prepare and execute all drawings and specifications for the construction of buildings and other structures.	11. To prepare and execute all drawings and specifications for the construction of buildings and other structures.	12. To prepare and execute all drawings and specifications for the construction of buildings and other structures.

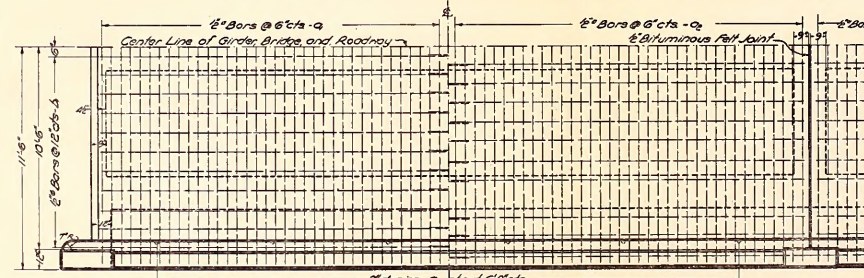


ELEVATION



HALF SECTION A-A

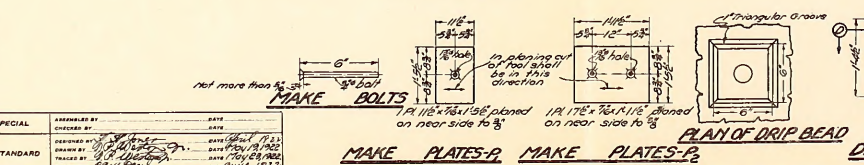
HALF SECTION B-B



SHOWING REINFORCEMENT IN TOP OF SLAB

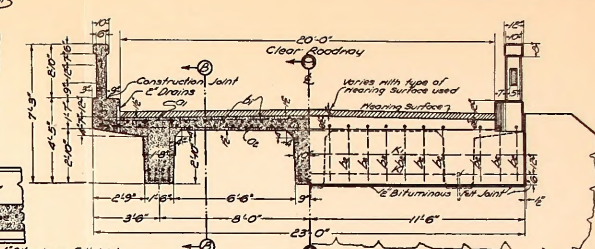
SHOWING REINFORCEMENT IN BOTTOM OF SLAB

HALF PLAN



DETAIL OF BARS-C-C

SECTION D-D



HALF INTERIOR SECTION

HALF END VIEW

SHOWING REINFORCEMENT IN CURTAIN WALL

DESIGN DATA

Specifications
Assumed Live Load
Impact Allowance
Wearing Surface
Steel Reinforcement
Concrete in Compression
This design is based on the ratios of bars as follows:
18,000 lbs. per sq. in.
6,500 lbs. per sq. in.
14,000 sq. in. 18" x 18" x 18" sq. in.

GENERAL NOTE

Class A Concrete to be used in slab girders and curbs. Proportions 1:2:4.
Class B Concrete to be used in hand rails above top of curbs. Proportions 1:2:3.
All reinforcing steel shall be deformed bars. Square twisted bars are not to be considered as deformed bars.
All dimensions relative to reinforcement are to centers of bars.
No splices of bars other than those shown on plans will be permitted.
All reinforcing steel to be securely held in correct position by means of approved metal slab bar spacers by clamps, deformed steel separators and bar-tyes. See plan showing typical details.
The girders, slabs and curbs must be poured at the same time allowing no time for initial set to take place between them. Construction joints permitted only at top of curbs.
Center to be 3' of center of span for single span bridges for multiple span bridges see center diagram.
The name plates to be placed on the bridge are on the inside of each right hand post approaching bridge. The corresponding panel in post to be omitted unless otherwise stated under Special Provisions the wearing surface is to be laid by the Road Contractor. The Engineer shall make certain that the top of the correct elevation for type of surfacing used.
All materials and workmanship as per standard specifications of the N.C. State Highway Commission.

PROJECT NO. _____
COUNTY _____

BILL OF MATERIAL					
Bar	No.	Size	Length	Weight	
1	74	2"	24'-0"	157.0	
2	74	2"	22'-0"	141.8	
3	74	2"	20'-0"	126.6	
4	74	2"	18'-0"	111.4	
5	74	2"	16'-0"	96.2	
6	74	2"	14'-0"	81.0	
7	74	2"	12'-0"	65.8	
8	74	2"	10'-0"	50.6	
9	74	2"	8'-0"	35.4	
10	74	2"	6'-0"	20.2	
11	74	2"	4'-0"	5.0	
12	74	2"	2'-0"	2.5	
13	74	2"	1'-0"	1.2	
14	74	2"	0'-0"	0.0	
15	74	2"	0'-0"	0.0	
16	74	2"	0'-0"	0.0	
17	74	2"	0'-0"	0.0	
18	74	2"	0'-0"	0.0	
19	74	2"	0'-0"	0.0	
20	74	2"	0'-0"	0.0	

BILL OF MATERIAL					
Bar	No.	Size	Length	Weight	
21	74	2"	24'-0"	157.0	
22	74	2"	22'-0"	141.8	
23	74	2"	20'-0"	126.6	
24	74	2"	18'-0"	111.4	
25	74	2"	16'-0"	96.2	
26	74	2"	14'-0"	81.0	
27	74	2"	12'-0"	65.8	
28	74	2"	10'-0"	50.6	
29	74	2"	8'-0"	35.4	
30	74	2"	6'-0"	20.2	
31	74	2"	4'-0"	5.0	
32	74	2"	2'-0"	2.5	
33	74	2"	1'-0"	1.2	
34	74	2"	0'-0"	0.0	
35	74	2"	0'-0"	0.0	
36	74	2"	0'-0"	0.0	
37	74	2"	0'-0"	0.0	
38	74	2"	0'-0"	0.0	
39	74	2"	0'-0"	0.0	
40	74	2"	0'-0"	0.0	

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
STANDARD
REINFORCED CONCRETE
DECK GIRDER
35'-0" SPAN 20'-0" ROADWAY
MAY 1922 SCALE 3/4"=1'-0"

REINFORCING STEEL LBS. 1021.8
CLASS A CONCRETE CUBIC YD. 4.7
CLASS B CONCRETE CUBIC YD. 4.8
PLATES & BOLTS LBS. 13.4

APPROVED BY: *Chas. Upham* ENGINEER
DATE: MAY 1922

SPECIAL
STANDARD

DESIGNED BY: *W. L. Upham*
CHECKED BY: *W. L. Upham*
DATE: *May 1922*
DRAWN BY: *W. L. Upham*
CHECKED BY: *W. L. Upham*
DATE: *May 1922*
DRAWN BY: *W. L. Upham*
CHECKED BY: *W. L. Upham*
DATE: *May 1922*

with two layers of bar paper

DETAIL OF
EXPANSION JOINT

13 EVANT

SECTION 32

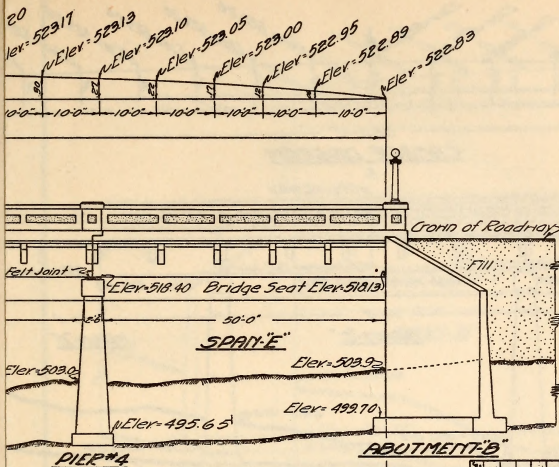
HALF SECTION A-A

TOP OF SLAB
SHOWING REINFORCEMENT IN THE SLAB
5" above ground surface

MAKE PLATES-R MAKE

STAG	VE 100-1000	JACOBS
STAG	VE 200-2000	
STAG	VE 300-3000	
STAG	VE 400-4000	GRACIATE
STAG	VE 500-5000	
STAG	VE 600-6000	

FED. ROAD DIST. NO.	STATE	FED. RD. DIST. NO.	PLACED YEAR	SHEET NO.	TOTAL SHEETS
10	NC	653		2	7



To safety switch and power line

5'-9"

48'-7 1/2"

SPAN	CONC.	STEEL	PIER	CONC.	STEEL	PIER
SPAN A	108.0	21639	184	108.0	21639	184
SPAN B	108.0	21639	184	108.0	21639	184
SPAN C	108.0	21639	184	108.0	21639	184
SPAN D	108.0	21639	184	108.0	21639	184
SPAN E	108.0	21639	184	108.0	21639	184
ABUT A	227.9	22522	92	227.9	22522	92
ABUT B	233.9	18729	92	233.9	18729	92
PIER #1	56.5	4901	187	56.5	4901	187
PIER #2	56.5	4901	187	56.5	4901	187
PIER #3	70.8	4804	187	70.8	4804	187
PIER #4	65.3	4528	187	65.3	4528	187
TOTAL	1253.5	166591	1852	1253.5	166591	1852

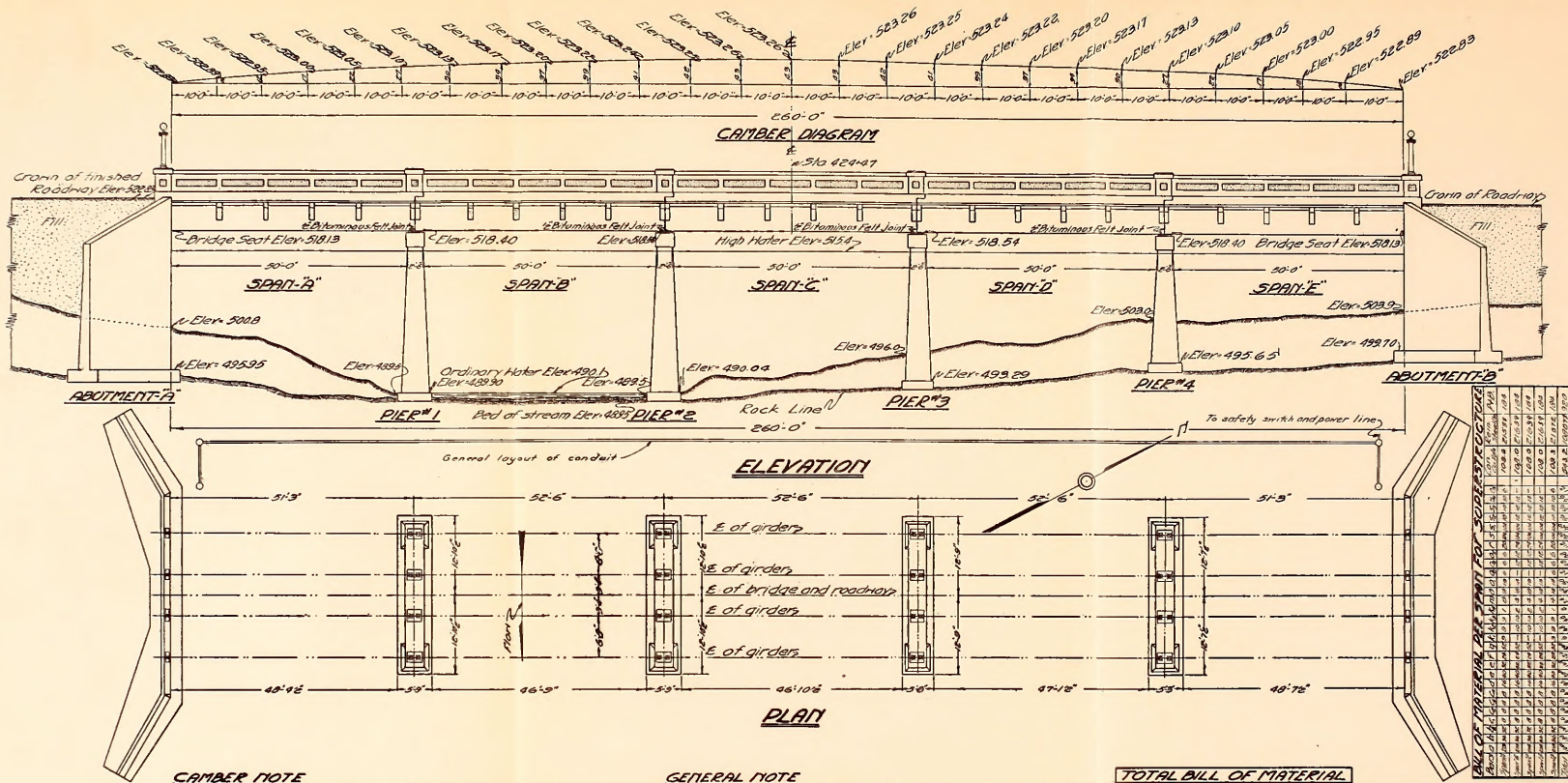
TOTAL BILL OF MATERIAL

	Class "A" Concrete	Reinforcing Steel	Plates 1 Bolt	Piles No.
SPAN "A"	108.0	21639	184	—
SPAN "B"	108.0	21639	184	—
SPAN "C"	108.0	21639	184	—
SPAN "D"	108.0	21639	184	—
SPAN "E"	108.0	21639	184	—
ABUT "A"	227.9	22522	92	—
ABUT "B"	233.9	18729	92	—
PIER #1	56.5	4901	187	—
PIER #2	56.5	4901	187	—
PIER #3	70.8	4804	187	—
PIER #4	65.3	4528	187	—
TERMINATING GUARDRAIL	129	—	—	—
TOTAL	1253.5	166591	1852	—

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
ENGINEER
GENERAL DRAWING
ENO RIVER BRIDGE
5-50 FT. RC. DECK GIRDERS
20 FT. CLEAR ROADWAY
PROJECT NO. 653 STA. 42+47
ORANGE COUNTY
JANUARY 1922

DESIGNED BY W. L. Brown
APPROVED BY Chas. L. Brown
DATE 1/17/22
STA. 42+47

PLAT NO. 653-16
DATE 1-19-22



CAMBER NOTE

Camber diagram does not include allowance for settlement of individual spans which should be provided for in addition to elevations given. After the falsework has been removed the finished structure should have the camber as shown. The elevations given are for crown of finished roadway. The rails, curbs and coping follow the same line of camber.

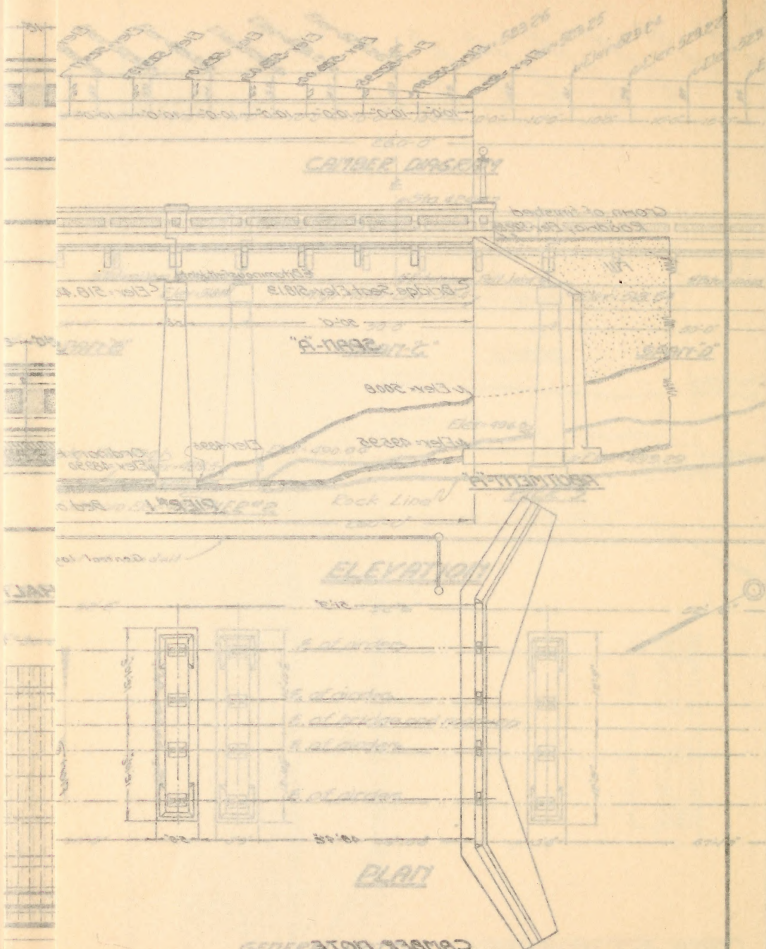
GENERAL NOTE

Class A Concrete to be used throughout. Proportions 1:2:4. Maximum size of aggregate 1 1/2". All reinforcing steel shall be deformed bars. Square twisted bars are not to be considered as deformed bars. No splices of bars other than shown on plans will be permitted. All materials and workmanship as per Specifications of the N.C. State Highway Commission. B.M. U.S. Geological Survey B.M. N.H. corner of Court House, 73 ft Sta 434+ Stamp'd Elev. 549. Note Equation. Proj. #219 Sta 424+47. Proj. #433 Sta 424+47.

TOTAL BILL OF MATERIAL

	Class A Concrete	Reinforcing Steel	Class B Concrete	Reinforcing Steel
SPAN A	103.9	21300	104	
SPAN B	108.0	21639	104	
SPAN C	108.0	21639	104	
SPAN D	108.0	21639	104	
SPAN E	108.0	21639	104	
ABUTMENT A	227.3	22326	32	
ABUTMENT B	227.3	22326	32	
PIER #1	56.5	4901	187	
PIER #2	56.5	4901	187	
PIER #3	56.5	4901	187	
PIER #4	56.5	4901	187	
TOTAL	1233.8	166591	1852	

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
GENERAL DRAWING
50-FOOT R.C. DECK GIRDERS
ROFF CLEAR ROADWAY
PROJECT #433 STA 424+47
ORANGE COUNTY
JANUARY 1922
DRAWN BY W. C. B.
CHECKED BY W. C. B.
APPROVED BY W. C. B.



GENERAL NOTES

1. All work shall be in accordance with the latest edition of the Standard Specifications for Highway Construction, as per Specifications for the U.S. Geological Survey, B.T. 1711 corner of Street 1, Moscow, T.A. 1711 570 494, stamped, Elevation 542.

2. The bridge shall be constructed in accordance with the latest edition of the Standard Specifications for Highway Construction, as per Specifications for the U.S. Geological Survey, B.T. 1711 corner of Street 1, Moscow, T.A. 1711 570 494, stamped, Elevation 542.

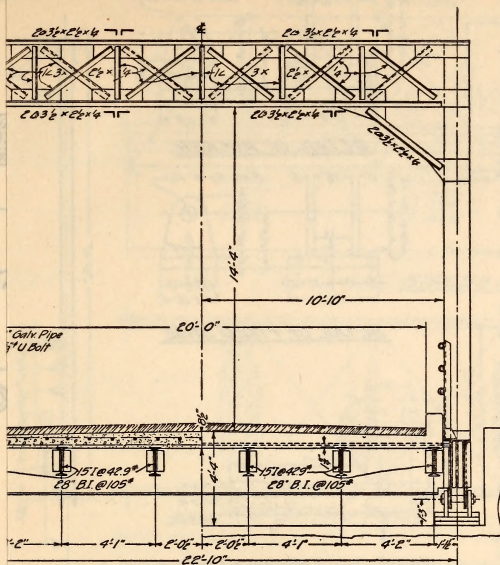
3. The bridge shall be constructed in accordance with the latest edition of the Standard Specifications for Highway Construction, as per Specifications for the U.S. Geological Survey, B.T. 1711 corner of Street 1, Moscow, T.A. 1711 570 494, stamped, Elevation 542.

4. The bridge shall be constructed in accordance with the latest edition of the Standard Specifications for Highway Construction, as per Specifications for the U.S. Geological Survey, B.T. 1711 corner of Street 1, Moscow, T.A. 1711 570 494, stamped, Elevation 542.

5. The bridge shall be constructed in accordance with the latest edition of the Standard Specifications for Highway Construction, as per Specifications for the U.S. Geological Survey, B.T. 1711 corner of Street 1, Moscow, T.A. 1711 570 494, stamped, Elevation 542.

1. All work shall be in accordance with the latest edition of the Standard Specifications for Highway Construction, as per Specifications for the U.S. Geological Survey, B.T. 1711 corner of Street 1, Moscow, T.A. 1711 570 494, stamped, Elevation 542.	2. The bridge shall be constructed in accordance with the latest edition of the Standard Specifications for Highway Construction, as per Specifications for the U.S. Geological Survey, B.T. 1711 corner of Street 1, Moscow, T.A. 1711 570 494, stamped, Elevation 542.	3. The bridge shall be constructed in accordance with the latest edition of the Standard Specifications for Highway Construction, as per Specifications for the U.S. Geological Survey, B.T. 1711 corner of Street 1, Moscow, T.A. 1711 570 494, stamped, Elevation 542.	4. The bridge shall be constructed in accordance with the latest edition of the Standard Specifications for Highway Construction, as per Specifications for the U.S. Geological Survey, B.T. 1711 corner of Street 1, Moscow, T.A. 1711 570 494, stamped, Elevation 542.	5. The bridge shall be constructed in accordance with the latest edition of the Standard Specifications for Highway Construction, as per Specifications for the U.S. Geological Survey, B.T. 1711 corner of Street 1, Moscow, T.A. 1711 570 494, stamped, Elevation 542.
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FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
10	N. C.			



F INTERIOR SECTION

HALF END VIEW

TA

N.C. State Highway Commission.
80 lbs. per sq. ft. or two 15 ton trucks.
30% of live load.
Not to exceed 30 lbs. per sq. ft.
3970' per linear foot of bridge.
Static 150' per lin. ft. on top and bottom chords.
Moving 150' per lin. ft. on bottom chord.
46000 lbs. per sq. ft.
16000 - 701.

NOTE

To be used thruout Proportions 1:1 1/2:3.
To be deformed bars. Square twisted bars are not to be used.
Will be permitted other than those shown on plans.
Reinforcing steel are to corners of bars.
must be poured at the same time allowing no time for re place.
To be securely held in correct position by means of b bar spacers and by ties so as to be positively placement. See sheet showing typical details stated under Special Provisions. The wearing surface Road Contractor.
To be Class B - Medium Grade.
To be riveted. All rivets 5/8 except in T.D where 5/4 are to be used.
Re 1/2 thick except for lateral connections.
Two coats of field paint as per specifications.
To be placed on each right hand and just approaching bridge.
Workmanship as per specifications of the N.C. State.

PROJECT NO.

COUNTY

SPAN	Weight
9' 3133	
6' 2926	
10' 1964	
12' 374	

Note: 7' placed heads

DET.

SPECIALS 8397
Vets 53.9
STANDARD 100,000

BILL OF MATERIAL - SPANS				
Bars	No.	Size	Length	Weight
a		1/2"	22'-9"	
a		1/2"	21'-9"	
b		1/2"	22'-0"	
c		1/2"	22'-0"	
Reinforcing Steel Lbs				
Concrete Class A Cmb.				
Structural Steel Lbs				

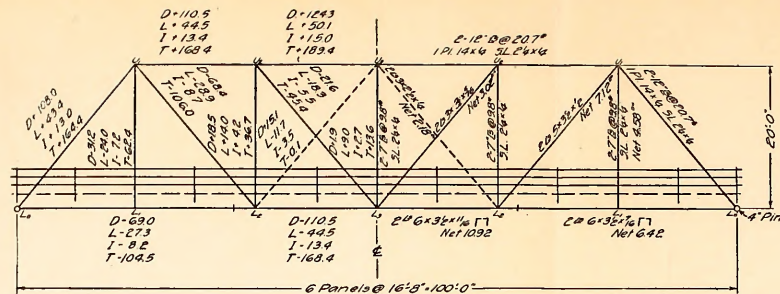
STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION

RALEIGH

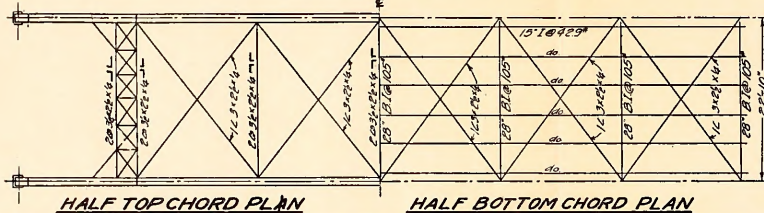
STANDARD
THRU PRATT TRUSS
WITH
REIN. CONCRETE FLOOR
SPAN-100'-0" ROADWAY 20'-0"
MAY 1922

SUBMITTED BY: W. L. Pratt
APPROVED BY: C. H. Pratt
BRIDGE ENGR.
STATE HIGHWAY ENGINEER

PLAN NO.

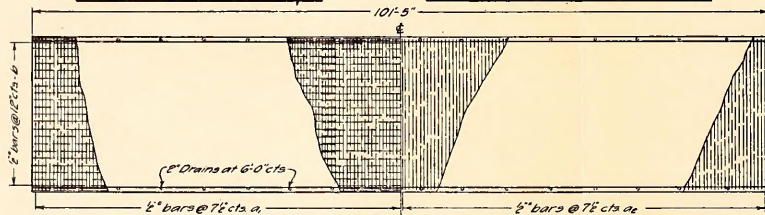


STRESS DIAGRAM



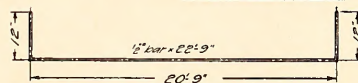
HALF TOP CHORD PLAN

HALF BOTTOM CHORD PLAN

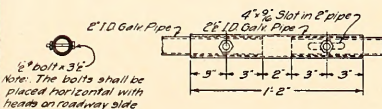


HALF FLOOR PLAN SHOWING REINFORCEMENT IN TOP OF FLOOR

HALF FLOOR PLAN SHOWING REINFORCEMENT IN BOTTOM OF FLOOR

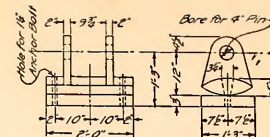


DETAIL OF BARS a

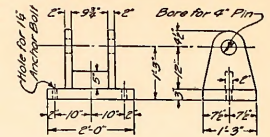


DETAIL OF EXPANSION JOINT IN RAILING

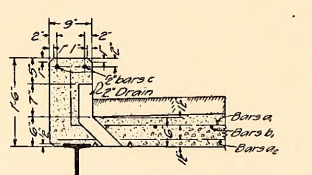
SPECIAL	ASSEMBLED BY	DATE
STANDARD	CHECKED BY	DATE
	DESIGNED BY	DATE
	DRAWN BY	DATE
	MADE BY	DATE
	CHECKED BY	DATE



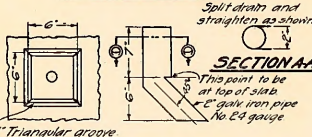
DETAIL OF ROCKER



DETAIL OF FIXED SHOE



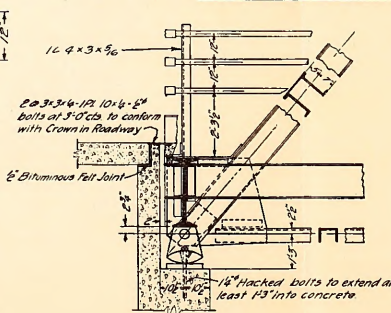
PART SECTION OF FLOOR SHOWING DRAIN



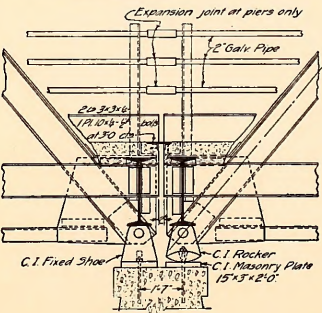
SECTION AA

DETAIL OF DRAIN

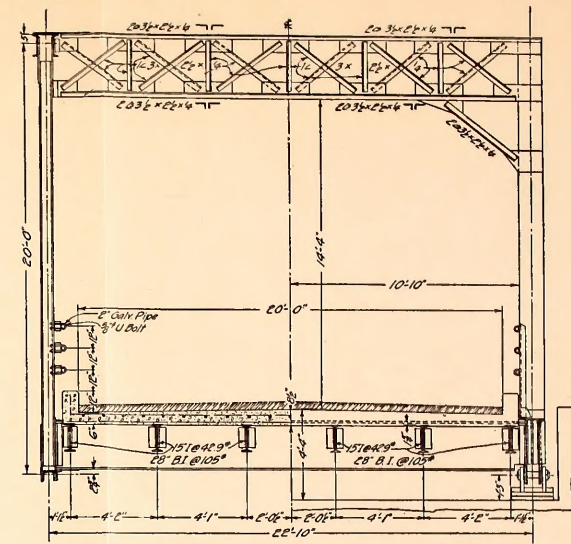
DETAIL OF DRAIN



DETAIL OF L at ABUTMENT



DETAIL OF L at PIER



HALF INTERIOR SECTION

HALF END VIEW

DESIGN DATA

Specifications
 Assume of Live Load
 Impact Allowance
 Wearing Surface
 Assumed Deck Load
 Assumed Wind Load
 Steel in Tension
 Steel in Compression

GENERAL NOTE

Class 'A' concrete to be used through Proportions 1111.8.
 All reinforcing steel to be deformed bars. Square spaced bars are not to be considered uniform bars.
 No splicing of bars will be permitted other than those shown on plans.
 All dimensions relative to reinforcing steel are to centers of bars.
 Unless otherwise stated under Special Provisions the wearing surface shall be laid by the Road Contractor.
 Structural Steel shall be Class 'A' Medium Grade.
 All fixed connections to be riveted. All rivets to be used in 7/8" where 5/8" are not used.
 All gusset plates to be 1/2" thick except for lateral connections.
 One end of each member, two ends of each panel, as per specifications.
 One name plate shall be placed on each right hand end post approaching bridge.
 All materials and workmanship as per specifications of the N.C. State Highway Commission.

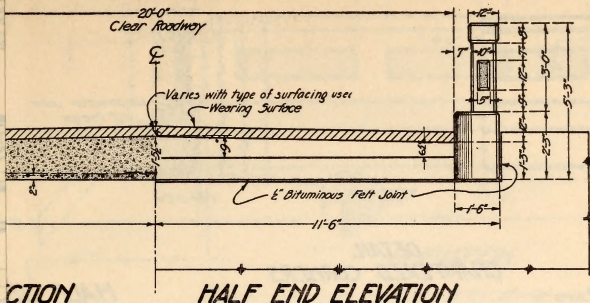
PROJECT NO.
COUNTY

ITEM	QTY	UNIT	PRICE	TOTAL
1	100	YD	1.00	100.00
2	100	YD	1.00	100.00
3	100	YD	1.00	100.00
4	100	YD	1.00	100.00
5	100	YD	1.00	100.00
6	100	YD	1.00	100.00
7	100	YD	1.00	100.00
8	100	YD	1.00	100.00
9	100	YD	1.00	100.00
10	100	YD	1.00	100.00

ITEM	QTY	UNIT	PRICE	TOTAL
1	100	YD	1.00	100.00
2	100	YD	1.00	100.00
3	100	YD	1.00	100.00
4	100	YD	1.00	100.00
5	100	YD	1.00	100.00
6	100	YD	1.00	100.00
7	100	YD	1.00	100.00
8	100	YD	1.00	100.00
9	100	YD	1.00	100.00
10	100	YD	1.00	100.00

STATE OF NORTH CAROLINA
 STATE HIGHWAY COMMISSION
 STANDARD
 THRU PRATT TRUSS
 WITH
 REIN. CONCRETE FLOOR
 3SPAN-100'0" ROADWAY 20'0"
 MAY 1922

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
10	N. C.			

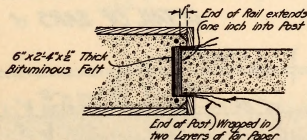


DESIGN DATA

Specifications _____ N.C. State Highway Commission.
Assumed Live Load _____ E Typical 15 Ton Trucks Passing.
Impact Allowance _____ 30% of Live Load.
Ballast _____ Not to exceed 50 lbs. per sq. ft.
Steel in Tension _____ 15000 Lbs. per sq. in.
Concrete in Compression _____ 650 Lbs. per sq. in.
This design is based on the net areas of bars as follows:
 $\frac{1}{8}\phi = 1963 \text{ sq. in.}$ $\frac{1}{2}\phi = 2500 \text{ sq. in.}$ $\frac{3}{8}\phi = 6013 \text{ sq. in.}$

GENERAL NOTE

Class "A" Concrete to be used in slab and curbs. Proportions 1:2:4.
Class "AA" Concrete to be used in hand rails above top of curbs. Proportions 1:1 1/2:3.
All reinforcing steel shall be deformed bars.
Square twisted bars are not to be considered as deformed bars.
All dimensions relative to reinforcement are to centers of bars.
No splices will be permitted other than shown.
All reinforcing steel to be securely held in correct position by means of approved metal slab bar spacers spaced 5'-0" cts., and by ties so as to be positively secured against displacement.
The slab and curbs must be poured at the same time allowing no time for initial set to take place between them. Construction joints permitted only at top of curbs.
Camber to be $\frac{1}{8}$ " at center of span for single span. For multiple spans see Camber Diagram.
Two name plates to be placed on the bridge, one on the inside of each right hand post approaching bridge. The corresponding panel in the post to be omitted.
All corners to be chamfered $\frac{1}{4}$ ".
Unless otherwise stated under "SPECIAL PROVISION" the wearing surface is to be laid by the Road Contractor.
The Engineer shall make certain that the top of the floor slab is at the correct elevation for the type of surfacing used.
All materials and workmanship as per latest standard specifications.



DETAIL
EXPANSION JOINT

PROJECT NO. _____
COUNTY _____

MATERIAL

LENGTH	WEIGHT
10'-0"	
10'-3"	
10'-6"	
10'-9"	
11'-0"	
11'-3"	
11'-6"	
11'-9"	
12'-0"	
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13'-0"	
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99'-9"	
100'-0"	
100'-3"	
100'-6"	
100'-9"	

BILL OF MATERIAL ONE SPAN

BARS	NO.	SIZE	LENGTH	WEIGHT
A	46	1/2"	19'-0"	179.6
B	4	1/2"	20'-9"	55
C	13	1/2"	16'-9"	256
D	13	1/2"	14'-3"	219
E	24	1/2"	4'-9"	76
F	8	1/2"	20'-9"	111
REINFORCING STEEL LBS.				2502
CONCRETE CLASS AA Cu.Yds.				2.1
CONCRETE CLASS A Cu.Yds.				22.8

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION

RALEIGH

STANDARD REINFORCED CONCRETE SLAB

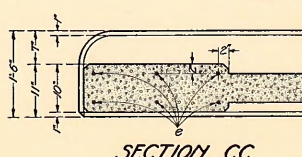
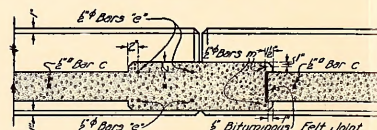
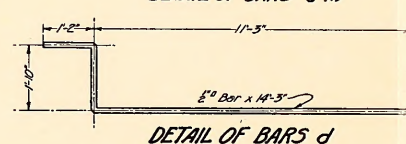
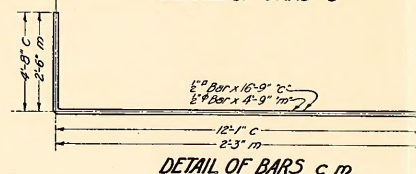
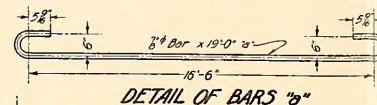
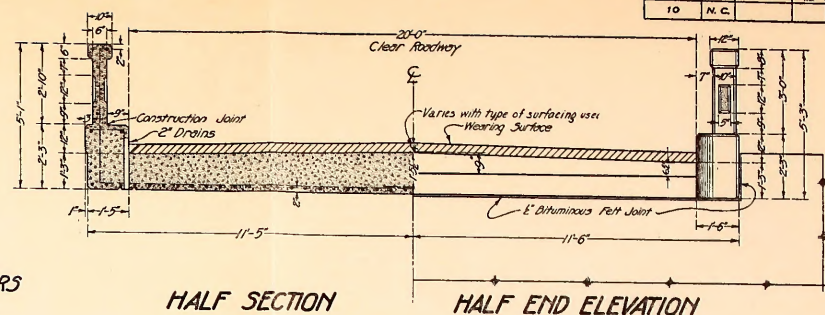
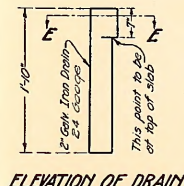
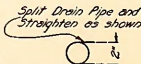
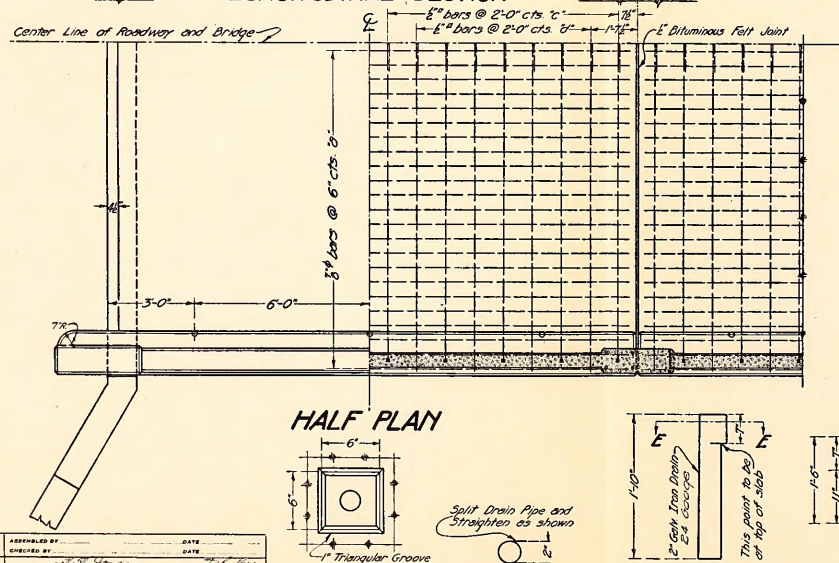
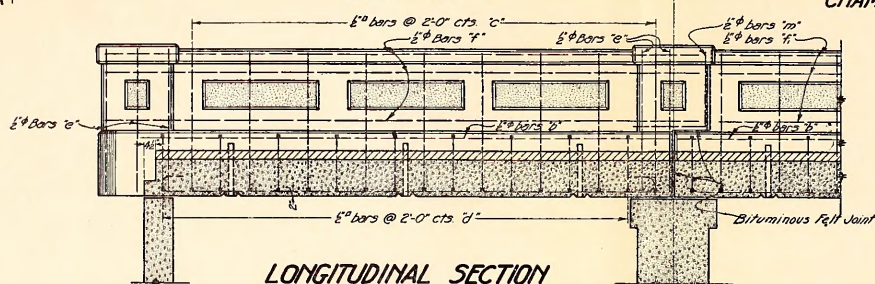
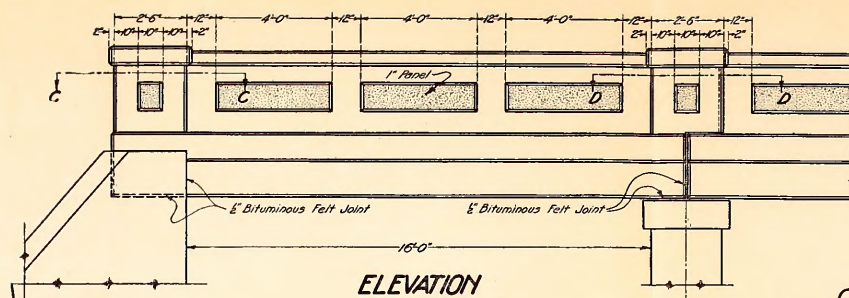
CLEAR SPAN 16'-0" ROADWAY 20'-0"

FEBRUARY 1922 SCALE $\frac{1}{2}" = 1'-0"$

SUBMITTED BY *W. L. Brown* BRIDGE ENGR.

APPROVED BY *Charles H. Brown* 2/22/22
STATE HIGHWAY COMMISSION

PLAN NO.



BILL OF MATERIAL			
BAR#	NO.	SIZE	LENGTH WEIGHT
D		5/8"	19'-0"
D		5/8"	18'-3"
C		5/8"	16'-9"
D		5/8"	14'-3"
E		5/8"	4'-9"
F		5/8"	20'-9"
H		5/8"	18'-3"
M		5/8"	4'-9"

REINFORCING STEEL LAB.

CONCRETE CLASS AA CUY03.

CONCRETE CLASS AB CUY03.

BILL OF MATERIAL			
ONE SPAN			
BAR#	NO.	SIZE	LENGTH
a	46	6#	19'-0"
b	4	6#	20'-9"
c	13	6#	20'-9"
d	13	6#	14'-3"
e	24	6#	4'-9"
f	8	6#	20'-9"

REINFORCING STEEL LBS. 2502

CONCRETE CLASS AA CU YDS. 2.2

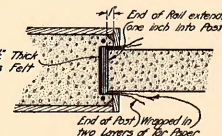
CONCRETE CLASS A CU YDS. 2.8

DESIGN DATA

Specifications	M.C. Stern Highway Commission.
Assumed Live Load	2 Typical 15 Ton Trucks Passing
Impact Allowance	30% of Live Load
Ballast	Not to exceed 20 lbs per sq. ft.
Steel in Tension	6000 Lbs. per sq. in.
Concrete in Compression	650 Lbs per sq. in.

This design is based on the net areas of bars as follows:

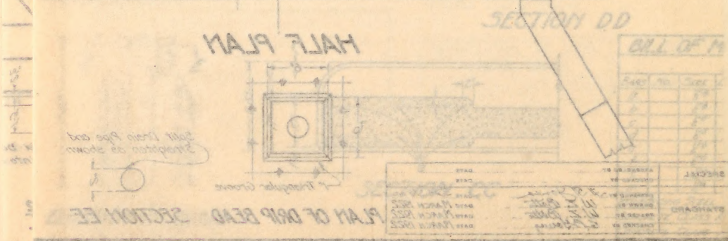
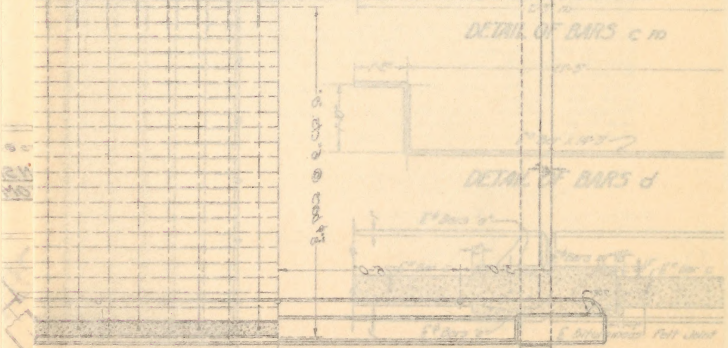
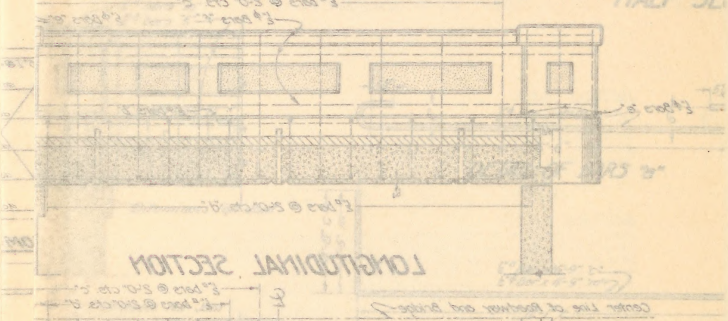
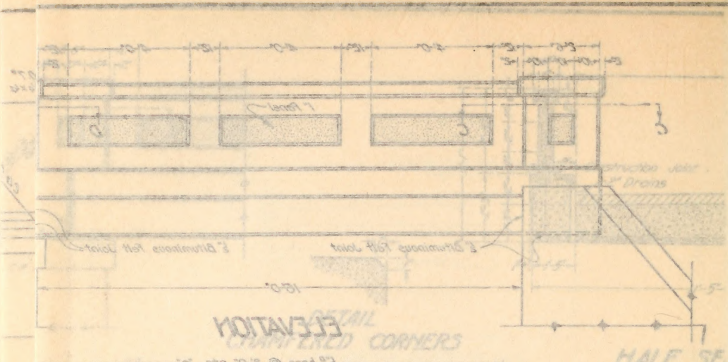
$E^{\phi} = 1963 \text{ sq. in.}$ $E^{\psi} = 2500 \text{ sq. in.}$ $E^{\theta} = 6011 \text{ sq. in.}$



PROJECT No. _____
COUNTY _____

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
HALEIGH
**STANDARD
REINFORCED CONCRETE
SLAB**
CLEAR SPAN 16'-0" ROADWAY 20'-0"
FEBRUARY 1922 SCALE $\frac{1}{2}"=1'-0"$

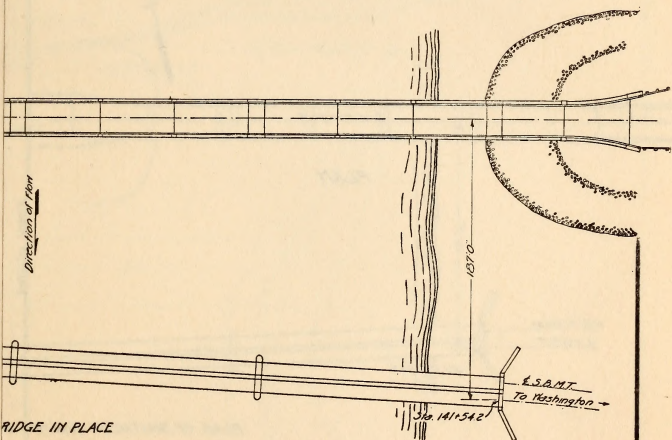
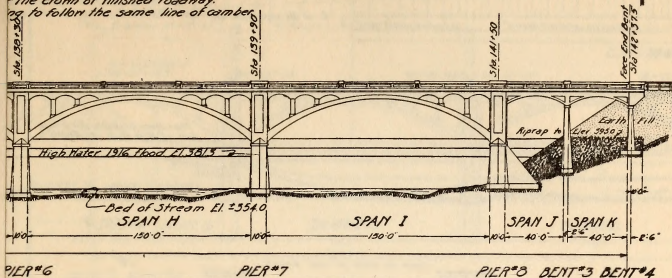
SUBMITTED BY: W. L. Brown BRIDGE ENGR.
APPROVED BY: Chas. L. Phineas 5/25/22



ITEM	QTY	UNIT	PRICE	TOTAL
1. CONCRETE	10.0	CU YD	1.50	15.00
2. REINFORCING BARS	100.0	LB	0.10	10.00
3. FORMWORK	100.0	SQ YD	0.20	20.00
4. LABOR	100.0	HOUR	0.15	15.00
5. TRANSPORTATION	10.0	CU YD	0.50	5.00
6. TOTAL				65.00

include allowance for settlement
should be provided in addition to
falsework has been removed the
have the camber as shown
the crown of finished roadway
to follow the same line of camber

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
10	N. C.			



PROJECT NO. 673
ROMAN-DAVIDSON COUNTY

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
RALEIGH

GENERAL DRAWING
OF
YADKIN RIVER BRIDGE
BETWEEN
ROMAN AND DAVIDSON COUNTIES
NEAR
YADKIN, N. C.
AUGUST 1922 SCALE 1"=400'

SUBMITTED BY *W. L. Cravens* BRIDGE ENGR.
APPROVED BY *Charles L. Shaw* DATE 10/21/22
STATE HIGHWAY ENGINEER

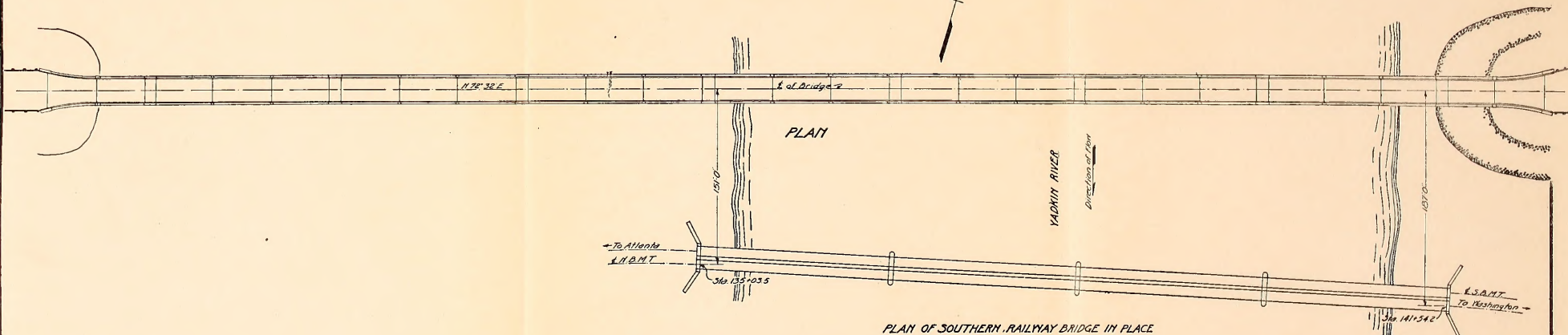
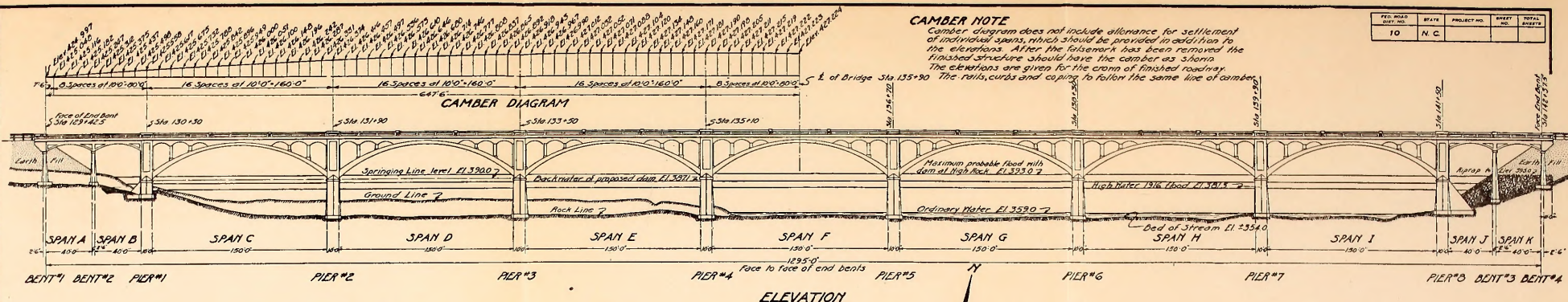
PLAN
NO.

STANDARD NO.

FED. ROAD DIST. NO.	SHEET	PROJECT NO.	SHEET NO.	TOTAL SHEETS
10	N. C.			

CAMBER NOTE

Camber diagram does not include allowance for settlement of individual spans, which should be provided in addition to the elevations. After the falsework has been removed the finished structure should have the camber as shown. The elevations are given for the crown of finished roadway. The rails, curbs and coping to follow the same line of camber.



PROJECT NO. 673
ROMAN-DAVIDSON COUNTY

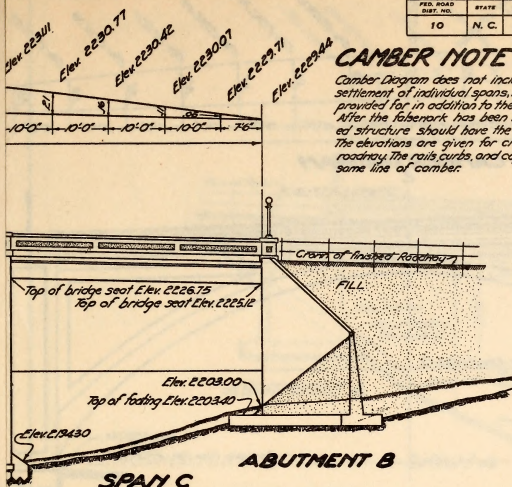
SPECIAL	APPROVED BY	DATE
STANDARD	DESIGNED BY	DATE
	CHECKED BY	DATE
	DESIGNED BY	DATE
	CHECKED BY	DATE

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
GENERAL DRAWING
OF
YADKIN RIVER BRIDGE
BETWEEN
ROMAN AND DAVIDSON COUNTIES
NEAR
YADKIN, N. C.
AUGUST 1922
SCALE 1"=40'-0"
APPROVED BY
STATE HIGHWAY ENGINEER
PLAN NO.

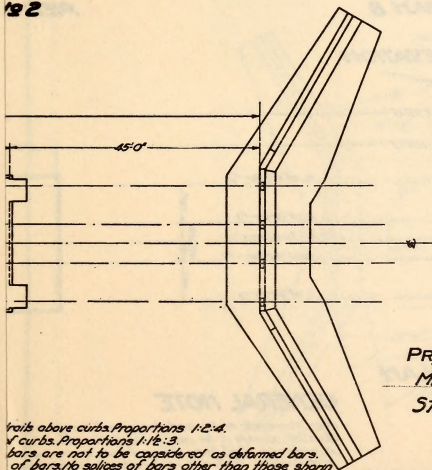
FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
10	N. C.	858	2	17

CAMBER NOTE

Camber Diagram does not include allowance for settlement of individual spans, which should be provided for in addition to the elevations given. After the falsework has been removed, the finished structure should have the camber as shown. The elevations are given for crown of finished roadway. The rails, curbs, and coping to follow the same line of camber.



182



PROJECT NO. 858
MITCHELL COUNTY
STATION 227+31.7

Trails above curbs. Proportions 1:2-4.
Curbs. Proportions 1:1 1/2:3.
Bars are not to be considered as deformed bars.
of bars. No splices of bars other than those shown.

tion by means of approved metal slab bar spacers,
plans showing typical detail.

oured at the same time allowing no time for initial set
span must be poured at the same time allowing no time for
to be poured first.

of each right hand post approaching bridge. The

meanings surface is to be laid by the bridge

floor slab is at the correct elevation for the type

ons of the N.C. State Highway Commission.

idge. Elev. 2217.24.

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION

SALESMAN

GENERAL DRAWING
BRIDGE OVER
ESTATOE RIVER
AT SPRUCE PINE N.C.

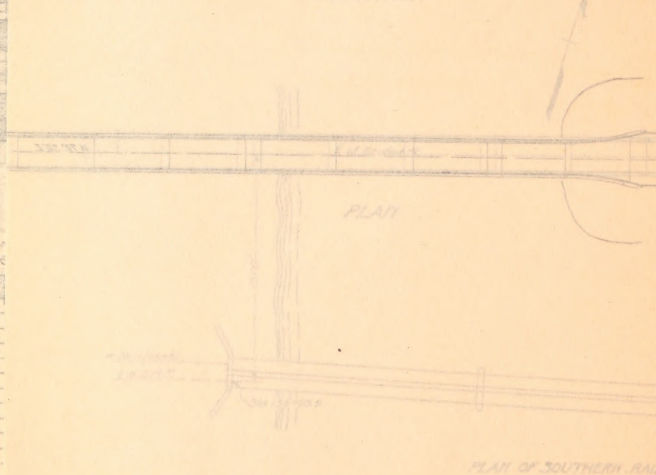
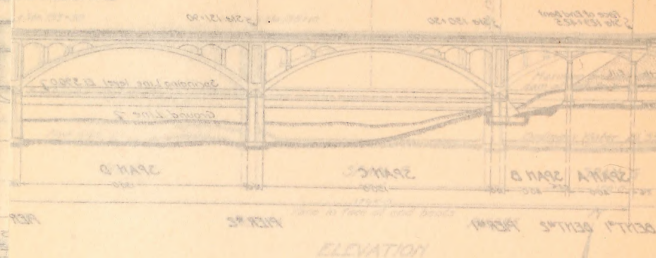
AUGUST 1922

SUBMITTED BY *W. L. Craven* BRIDGE ENGR.
APPROVED BY *Chas. Upshaw* DATE *8/10/22*
STATE HIGHWAY ENGINEER

PLAN
NO.
61.10.27
Aug. 1922

CAMBER NOTE

CAMBER NOTE



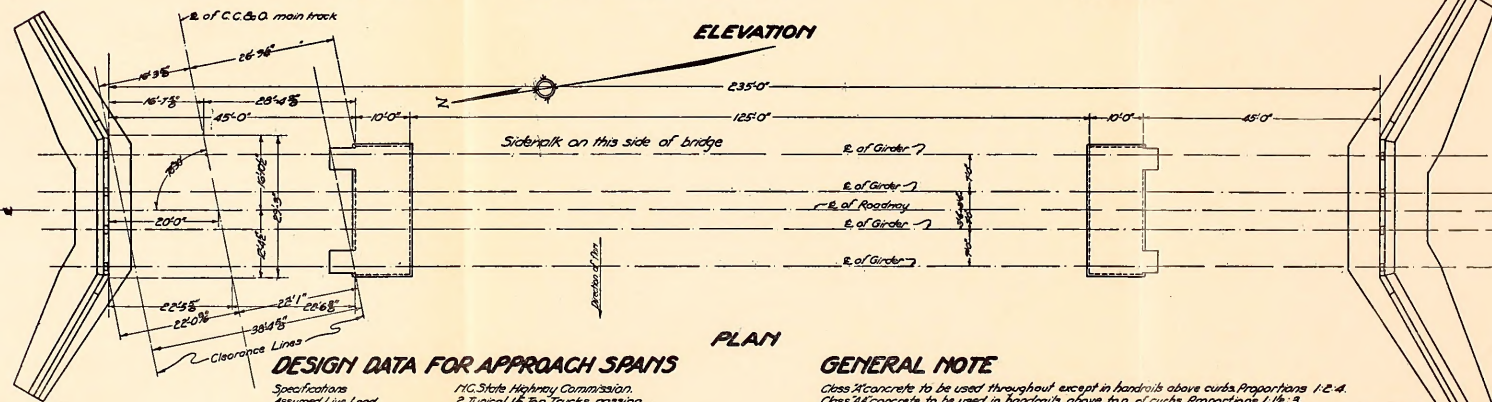
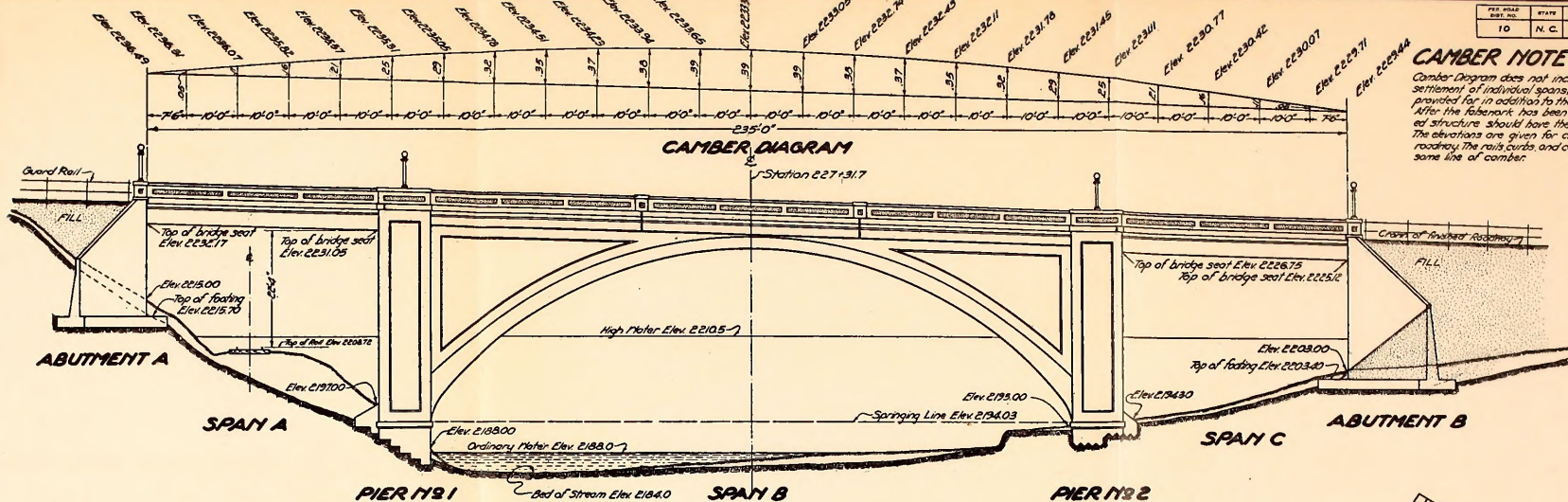
PLAN OF SOUTHERN RAILROAD

DATE	BY	REVISION
1900	W. H. HARRIS	1
1901	W. H. HARRIS	2
1902	W. H. HARRIS	3
1903	W. H. HARRIS	4
1904	W. H. HARRIS	5
1905	W. H. HARRIS	6
1906	W. H. HARRIS	7
1907	W. H. HARRIS	8
1908	W. H. HARRIS	9
1909	W. H. HARRIS	10
1910	W. H. HARRIS	11
1911	W. H. HARRIS	12
1912	W. H. HARRIS	13
1913	W. H. HARRIS	14
1914	W. H. HARRIS	15
1915	W. H. HARRIS	16
1916	W. H. HARRIS	17
1917	W. H. HARRIS	18
1918	W. H. HARRIS	19
1919	W. H. HARRIS	20
1920	W. H. HARRIS	21
1921	W. H. HARRIS	22
1922	W. H. HARRIS	23
1923	W. H. HARRIS	24
1924	W. H. HARRIS	25
1925	W. H. HARRIS	26
1926	W. H. HARRIS	27
1927	W. H. HARRIS	28
1928	W. H. HARRIS	29
1929	W. H. HARRIS	30
1930	W. H. HARRIS	31
1931	W. H. HARRIS	32
1932	W. H. HARRIS	33
1933	W. H. HARRIS	34
1934	W. H. HARRIS	35
1935	W. H. HARRIS	36
1936	W. H. HARRIS	37
1937	W. H. HARRIS	38
1938	W. H. HARRIS	39
1939	W. H. HARRIS	40
1940	W. H. HARRIS	41
1941	W. H. HARRIS	42
1942	W. H. HARRIS	43
1943	W. H. HARRIS	44
1944	W. H. HARRIS	45
1945	W. H. HARRIS	46
1946	W. H. HARRIS	47
1947	W. H. HARRIS	48
1948	W. H. HARRIS	49
1949	W. H. HARRIS	50
1950	W. H. HARRIS	51
1951	W. H. HARRIS	52
1952	W. H. HARRIS	53
1953	W. H. HARRIS	54
1954	W. H. HARRIS	55
1955	W. H. HARRIS	56
1956	W. H. HARRIS	57
1957	W. H. HARRIS	58
1958	W. H. HARRIS	59
1959	W. H. HARRIS	60
1960	W. H. HARRIS	61
1961	W. H. HARRIS	62
1962	W. H. HARRIS	63
1963	W. H. HARRIS	64
1964	W. H. HARRIS	65
1965	W. H. HARRIS	66
1966	W. H. HARRIS	67
1967	W. H. HARRIS	68
1968	W. H. HARRIS	69
1969	W. H. HARRIS	70
1970	W. H. HARRIS	71
1971	W. H. HARRIS	72
1972	W. H. HARRIS	73
1973	W. H. HARRIS	74
1974	W. H. HARRIS	75
1975	W. H. HARRIS	76
1976	W. H. HARRIS	77
1977	W. H. HARRIS	78
1978	W. H. HARRIS	79
1979	W. H. HARRIS	80
1980	W. H. HARRIS	81
1981	W. H. HARRIS	82
1982	W. H. HARRIS	83
1983	W. H. HARRIS	84
1984	W. H. HARRIS	85
1985	W. H. HARRIS	86
1986	W. H. HARRIS	87
1987	W. H. HARRIS	88
1988	W. H. HARRIS	89
1989	W. H. HARRIS	90
1990	W. H. HARRIS	91
1991	W. H. HARRIS	92
1992	W. H. HARRIS	93
1993	W. H. HARRIS	94
1994	W. H. HARRIS	95
1995	W. H. HARRIS	96
1996	W. H. HARRIS	97
1997	W. H. HARRIS	98
1998	W. H. HARRIS	99
1999	W. H. HARRIS	100

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
10	N. C.	858	2	17

CAMBER NOTE

Camber diagram does not include allowance for settlement of individual spans, which should be provided for in addition to the elevations given. After the falsework has been removed, the finished structure should have the camber as shown. The elevations are given for crown of finished roadway. The rails curbs and coping to follow the same line of camber.



DESIGN DATA FOR APPROACH SPANS

Specifications
Assumed Live Load
Impact Allowance
Wearing Surface
Steel in Tension
Concrete in Compression
This design is based on the net area of bars as follows:
2" 0.786 sq. in., 2" 0.250 sq. in., 3" 0.442 sq. in., 1" 0.100 sq. in., 1 1/2" 0.266 sq. in., 1 3/4" 0.353 sq. in.

DESIGN DATA FOR ARCH RIB

Specifications
Assumed Live Load
Impact Allowance
Wearing Surface
Steel in Tension
Concrete in Compression
This design is based on the net area of bars as follows:
2" 0.786 sq. in., 2" 0.250 sq. in., 3" 0.442 sq. in., 1" 0.100 sq. in., 1 1/2" 0.266 sq. in., 1 3/4" 0.353 sq. in.

GENERAL NOTE

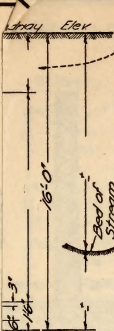
Class A concrete to be used throughout except in handrails above curbs. Proportions 1-2-4.
Class A concrete to be used in handrails above top of curbs. Proportions 1-1 1/2-3.
All reinforcing steel to be deformed bars. Square twisted bars are not to be considered as deformed bars.
All dimensions relative to reinforcement are to centers of bars. No splices of bars other than those shown on plans will be permitted.
All reinforcing steel to be securely held in correct position by means of approved metal slab bar spacers, bays, beam saddles, separators and bar ties. See plans showing typical detail.
The girders, slab and curbs of approach span must be poured at the same time allowing no time for initial set to take place between them. The slab and curbs of arch span must be poured at the same time allowing no time for initial set to take place between them. Center slab of arch to be poured first.
Two name plates to be placed on bridge, one on the inside of each right hand post approaching bridge. The corresponding panel to be omitted.
Unless otherwise stated under Special Provisions the wearing surface is to be laid by the Bridge Contractor.
All cameras to be chamfered 1".
The Engineer shall make certain that the top of the floor slab is at the correct elevation for the type of surfacing used.
All materials and workmanship as per the Specifications of the N.C. State Highway Commission.
A.T. Top of ball end of truss S.E. abutment of present bridge Elev. 221.24.

PROJECT NO. 858
MITCHELL COUNTY
STATION 227+31.7

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
GENERAL DRAWING
BRIDGE OVER
ESTATOE RIVER
AT SPRUCE PINE N.C.
AUGUST 1922

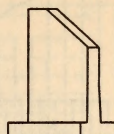
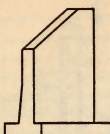
SPECIAL	DATE	BY	CHECKED
DESIGNED BY	2/4/22	W. L. G. Jones	
DRAWN BY	2/4/22	W. L. G. Jones	
TRACE BY	2/4/22	W. L. G. Jones	
CHECKED BY	2/4/22	W. L. G. Jones	

DESIGNED BY	DATE	BY	CHECKED
DESIGNED BY	2/4/22	W. L. G. Jones	
DRAWN BY	2/4/22	W. L. G. Jones	
TRACE BY	2/4/22	W. L. G. Jones	
CHECKED BY	2/4/22	W. L. G. Jones	



To vary according to type of surfacing used.

FED. ROAD DIST. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	START NO.	TERMINAL SHEETS
10	N. C.				



ELEVATION SHOWING PROFILE

A



DESIGN DATA

Specifications N.C. State Highway Commission
 Equivalent fluid pressure of earth 30 lbs. per cu. ft.
 Steel in tension 16000 lbs. per sq. in.
 Concrete in compression 6500 lbs. per sq. in.
 Shear Class A concrete 40 lbs. per sq. in.
 This design is based on the net area of bars as follows: $E = 0.250$ sq. in. $\frac{1}{4} = 0.307$ sq. in. $\frac{3}{4} = 0.442$ sq. in.
 $1 = 0.785$ sq. in. $1\frac{1}{2} = 1.000$ sq. in.

GENERAL NOTE

Class A concrete to be used throughout. Proportions 1:2:4.
 All reinforcing steel shall be securely held in correct position by means of approved metal slab bar spacers and by ties so as to be positively secured against displacement. See plan showing typical detail.
 All reinforcing steel shall be deformed bars. Square twisted bars are not to be considered deformed bars. All dimensions relative to reinforcement are to centers of bars. No splices of bars will be permitted other than those shown on plans. S-drains are to be placed at 10'-0" centers in rings and abutment just above the present ground line.
 All materials and workmanship as per Specifications of the N.C. State Highway Commission.
 All exposed corners to be chamfered 1".

BILL OF MATERIAL

Bar	No.	Size	Length	Height
V		2"Ø		
W		2"Ø		
X		2"Ø		
Y		2"Ø		
Z		2"Ø		
AA		2"Ø		
BB		2"Ø		
CC		2"Ø		
DD		2"Ø		
EE		2"Ø		
FF		2"Ø		
GG		2"Ø		
HH		2"Ø		
II		2"Ø		
JJ		2"Ø		
KK		2"Ø		
LL		2"Ø		
MM		2"Ø		
NN		2"Ø		
OO		2"Ø		
PP		2"Ø		
QQ		2"Ø		
RR		2"Ø		
SS		2"Ø		
TT		2"Ø		
UU		2"Ø		
VV		2"Ø		
WW		2"Ø		
XX		2"Ø		
YY		2"Ø		
ZZ		2"Ø		
AAA		2"Ø		
BBB		2"Ø		
CCC		2"Ø		
DDD		2"Ø		
EEE		2"Ø		
FFF		2"Ø		
GGG		2"Ø		
HHH		2"Ø		
III		2"Ø		
JJJ		2"Ø		
KKK		2"Ø		
LLL		2"Ø		
MMM		2"Ø		
NNN		2"Ø		
OOO		2"Ø		
PPP		2"Ø		
QQQ		2"Ø		
RRR		2"Ø		
SSS		2"Ø		
TTT		2"Ø		
UUU		2"Ø		
VVV		2"Ø		
WWW		2"Ø		
XXX		2"Ø		
YYY		2"Ø		
ZZZ		2"Ø		

Reinforcing Steel Lbs.

Concrete Class A Cules

Piles No.

Plates & Bolts Lbs.

Concrete per foot depth of footing for one abutment and two wing walls - Cu Yds.

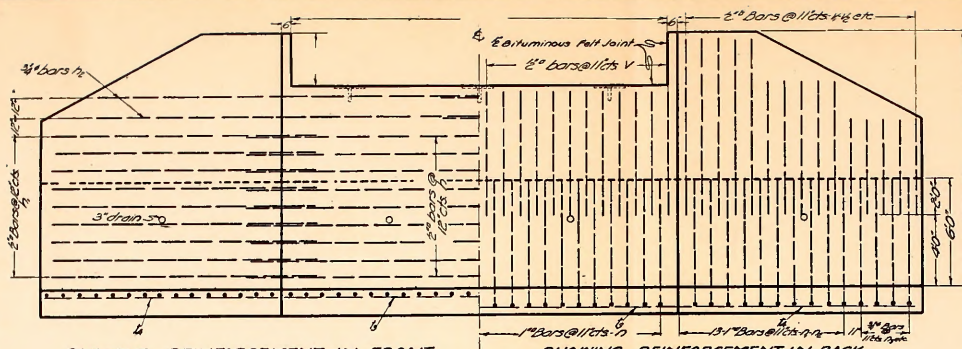
PROJECT No. _____
 COUNTY _____
 STATION _____

STATE OF NORTH CAROLINA STATE HIGHWAY COMMISSION RALEIGH	
STANDARD R.C. ABUTMENT FOR DECK GIRDER BRIDGES HEIGHT OVERALL 16'-0"	
DECEMBER 1921	
SUBMITTED BY <u>W. L. Cravell</u> BRIDGE ENGR.	PLAN NO.
APPROVED <u>Charlyham</u> DATE <u>1/1/22</u> STATE HIGHWAY ENGINEER	

OF BARS

ETC.

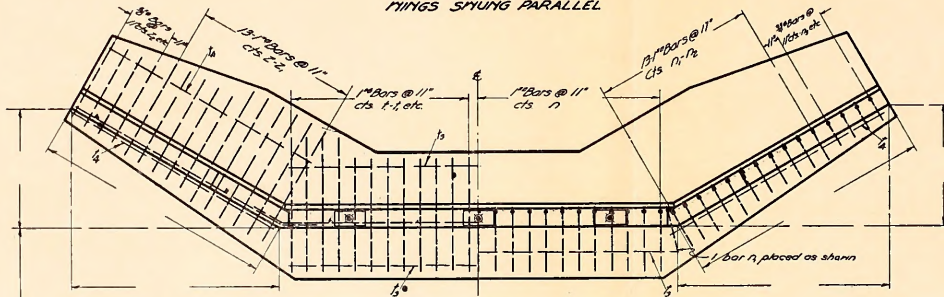
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SHORING REINFORCEMENT IN FRONT OF MALL AND TOP OF FOOTING

SHORING REINFORCEMENT IN BACK OF MALL AND BOTTOM OF FOOTING

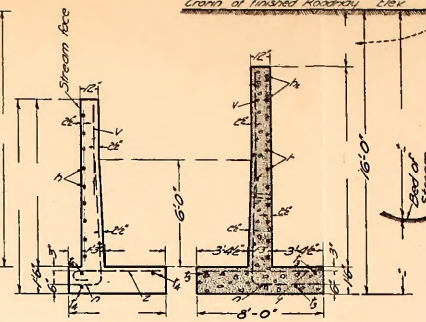
ELEVATION
MINGS SPUNG PARALLEL



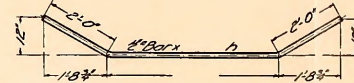
SHORING REINFORCEMENT IN FRONT OF MALL AND TOP OF FOOTING

SHORING REINFORCEMENT IN BACK OF MALL AND BOTTOM OF FOOTING

PLAN



END OF MING SECTION A-A



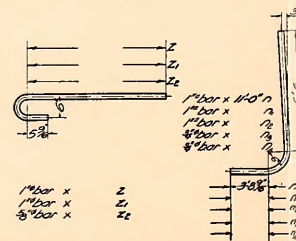
DETAIL OF BARS 1h



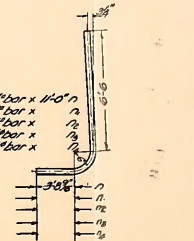
DETAIL OF BARS 1h



DETAIL OF BARS 1h/2



DETAIL OF BARS
Z-Z etc.



DETAIL OF BARS
D-D etc.



ELEVATION SHOWING PROFILE

DESIGN DATA

Specifications N.C. State Highway Commission
Equivalent fluid pressure of earth 30 lbs. per cu. ft.
Steel in tension 16000 lbs. per sq. in.
Concrete in compression 650 lbs. per sq. in.
Shear Class A concrete 40 lbs. per sq. in.
This design is based on the net area of bars as follows: 2\"/>

GENERAL NOTE

Class A concrete to be used throughout. Proportions 1:2:4.
All reinforcing steel shall be securely held in correct position by means of approved metal slab bar spacers and by ties so as to be positively secured against displacement. See plan showing typical detail.
All reinforcing steel shall be deformed bars. Square twisted bars are not to be considered. Deformed bars. All dimensions relative to reinforcement are to centers of bars. No splices of bars will be permitted other than those shown on plans. S-drains are to be placed at 10' centers in wings and abutment just above the present ground line.
All materials and workmanship as per Specifications of the N.C. State Highway Commission.
All exposed corners to be chamfered 1\"/>

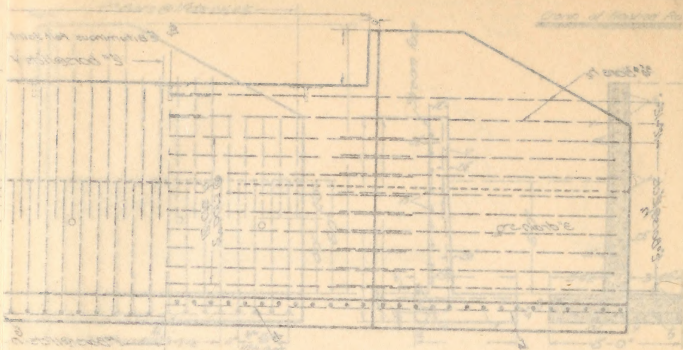
BILL OF MATERIAL

Bar No.	Size	Length	Weight
1	3/4"	11'-0"	
2	3/4"	11'-0"	
3	3/4"	11'-0"	
4	3/4"	11'-0"	
5	3/4"	11'-0"	
6	3/4"	11'-0"	
7	3/4"	11'-0"	
8	3/4"	11'-0"	
9	3/4"	11'-0"	
10	3/4"	11'-0"	
11	3/4"	11'-0"	
12	3/4"	11'-0"	
13	3/4"	11'-0"	
14	3/4"	11'-0"	
15	3/4"	11'-0"	
16	3/4"	11'-0"	
17	3/4"	11'-0"	
18	3/4"	11'-0"	
19	3/4"	11'-0"	
20	3/4"	11'-0"	
21	3/4"	11'-0"	
22	3/4"	11'-0"	
23	3/4"	11'-0"	
24	3/4"	11'-0"	
25	3/4"	11'-0"	
26	3/4"	11'-0"	
27	3/4"	11'-0"	
28	3/4"	11'-0"	
29	3/4"	11'-0"	
30	3/4"	11'-0"	
31	3/4"	11'-0"	
32	3/4"	11'-0"	
33	3/4"	11'-0"	
34	3/4"	11'-0"	
35	3/4"	11'-0"	
36	3/4"	11'-0"	
37	3/4"	11'-0"	
38	3/4"	11'-0"	
39	3/4"	11'-0"	
40	3/4"	11'-0"	
41	3/4"	11'-0"	
42	3/4"	11'-0"	
43	3/4"	11'-0"	
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47	3/4"	11'-0"	
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49	3/4"	11'-0"	
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72	3/4"	11'-0"	
73	3/4"	11'-0"	
74	3/4"	11'-0"	
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84	3/4"	11'-0"	
85	3/4"	11'-0"	
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93	3/4"	11'-0"	
94	3/4"	11'-0"	
95	3/4"	11'-0"	
96	3/4"	11'-0"	
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100	3/4"	11'-0"	

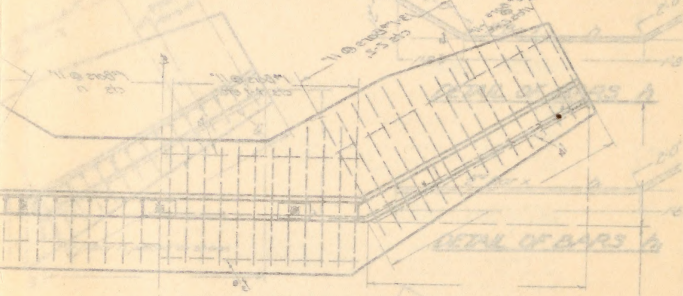
PROJECT No. COUNTY
STATION

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
STANDARD
R.C. ABUTMENT
FOR
DECK GIRDER BRIDGES
HEIGHT OVERALL 16'-0"
DECEMBER 1921
APPROVED BY *W. L. C. C. C.*
UNAPPROVED BY *W. L. C. C. C.*
STANDARD NO. A-616

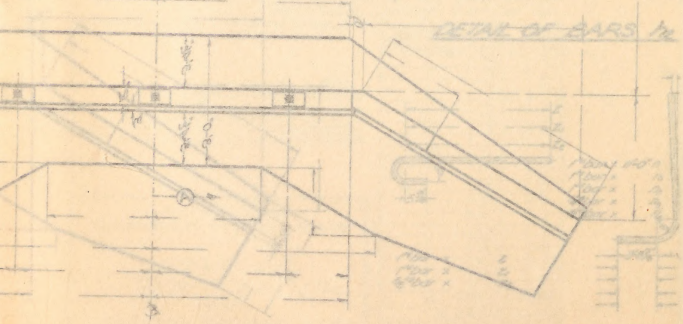
SPECIAL	ASSEMBLED BY	DATE
STANDARD	DESIGNED BY	DATE
	CHECKED BY	DATE
	APPROVED BY	DATE



ELEVATION
OF WALL AND TOP OF FOOTING
SHOWING REINFORCEMENT IN FRONT
OF WALL



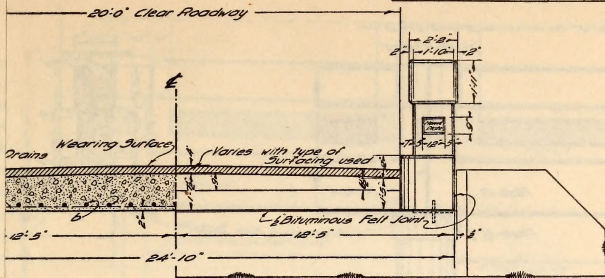
DETAIL OF BARS 1/2
SHOWING REINFORCEMENT IN FRONT
OF WALL AND TOP OF FOOTING



DETAIL OF BARS

NO.	DESCRIPTION	QUANTITY	UNIT	TOTAL
1
2
3
4
5
6
7
8
9
10

FED. ROAD DIST. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
10	N. C.			



TERIOR SECTION HALF END VIEW

DESIGN DATA

Specifications
Assumed Live Load
Impact Allowance
Wearing Surface
Steel in Tension
Concrete in Compression
This design is based on the
1.0, 0.255 sq.in. 5.0, 0.196 sq.in.

N.C. State Highway Commission
2 Typical 15-ton Trucks passing
30% of Live Load
Not to exceed 50 lbs per sq. ft.
1600 lbs per sq.in.
650 lbs per sq.in.
2.0, 0.250 sq.in. 1.0, 0.196 sq.in.

GENERAL NOTE:

Class A concrete to be used throughout. Proportions 1:2:4
All reinforcing steel shall be deformed bars, squares
twisted bars are not to be considered as deformed bars.
All dimensions relative to reinforcement are to centers of bars.
No splices of bars other than those shown on plans
will be permitted.
All reinforcing steel to be securely held in correct
position by means of approved metal slab bar spacers,
hy. chairs, beam saddles, separators, and bar-lys. See
plans showing typical details.
The girders, slab, and curbs must be poured at the
same time allowing no time for initial set to take place
between them.

BARS

Comber to be 1" at center of span for single span
bridges. For multiple span bridges see Comber
Diagram.
Two name plates to be placed on the bridge, one
on the end of each right hand post approaching
bridge. The corresponding panel in past to be
omitted.
All corners to be chamfered 1".
Unless otherwise stated under Special Provisions, the
wearing surface is to be laid by the Road Contractor.
The Engineer shall make certain that the top of
floor slab is at the correct elevation for type of
surfacing used.
All materials and workmanship as per standard
specifications of the N.C. State Highway Commission.

PROJECT NO.

COUNTY

OF MATERIAL SPANS

Size	Length	Weight
1" 6"	26'-6"	
1" 10"	30'-3"	
1" 6"	19'-6"	
1" 10"	43'-0"	
1" 6"	36'-6"	
1" 10"	30'-3"	
1" 6"	37'-3"	
1" 6"	14'-0"	

BILL OF MATERIAL ONE SPAN

Bar No	Size	Length	Weight
a	37	1" 6"	26.6
a	36	1" 10"	30.3
b	50	1" 6"	6.51
c	4	1" 10"	43.0
c	4	1" 6"	36.6
d	8	1" 10"	39.3
d	4	1" 6"	37.3
e	94	1" 6"	14.0

Reinforcing Steel Lbs 110
Concrete Class A Ckls 70.9
Plates & Bolts Lbs 110

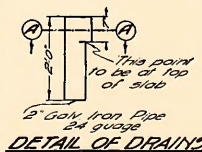
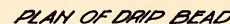
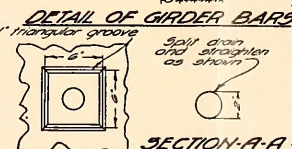
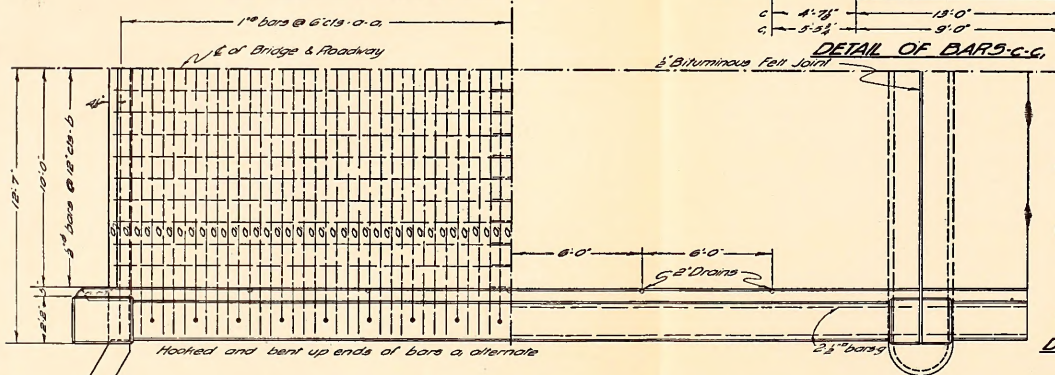
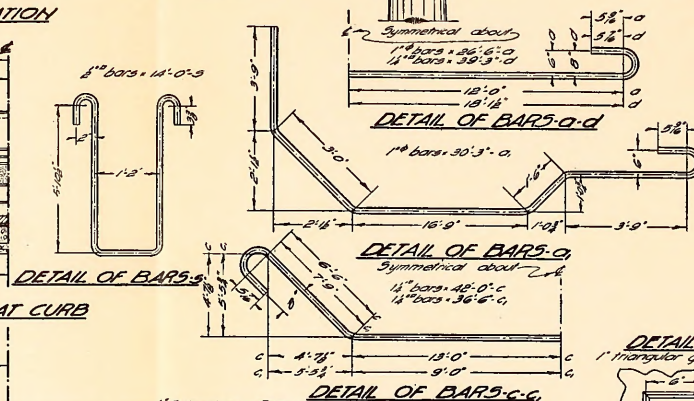
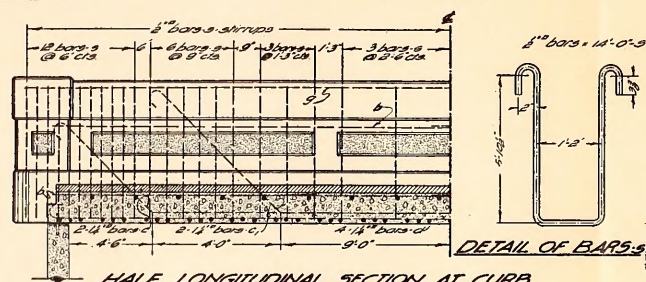
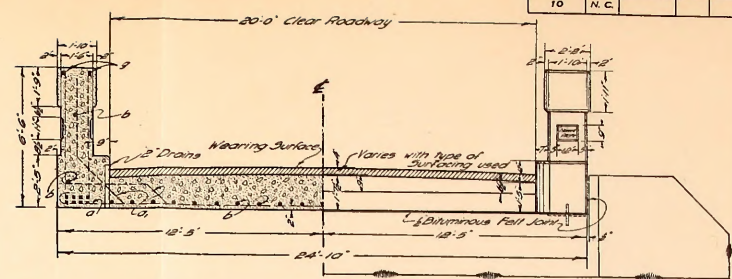
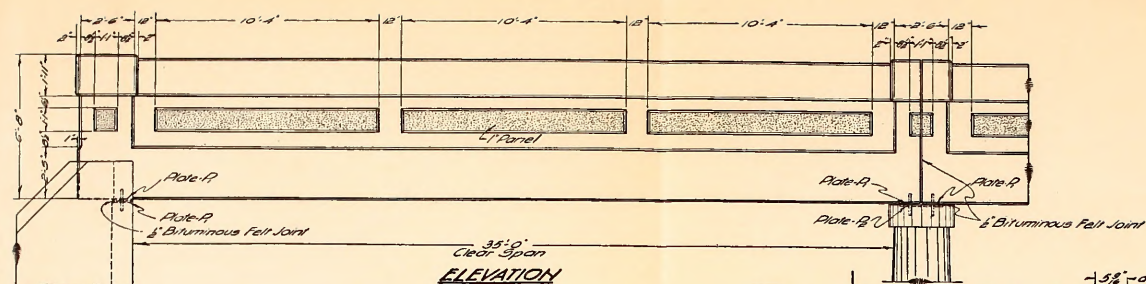
STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION

RALEIGH

STANDARD
REINFORCED CONCRETE
THROUGH GIRDER
35'-0" SPAN 20'-0" ROADWAY
SEPTEMBER 1922

SUBMITTED BY W. L. Craven BRIDGE ENGR.
APPROVED BY Chas. Upshaw STATE HIGHWAY ENGINEER

PLAN NO.



BILL OF MATERIALS			
SPANS			
Bar	No	Size	Length Weight
a		1" ϕ	25'-6"
a		1" ϕ	30'-3"
b		1" ϕ	19'-6"
c		1" ϕ	42'-0"
c		1" ϕ	36'-6"
d		1" ϕ	30'-3"
e		1" ϕ	37'-3"
f		1" ϕ	12'-0"

Reinforcing Steel Lbs
Concrete (Cassida) Cakes
Piles & Bolts Lbs

BILL OF MATERIAL			
ONE SPAN			
Bar	No	Size	Length Weight
a	37	1"Ø	25'6" 2616
c	36	1"Ø	30'3" 2908
b	50	1"Ø	19'6" 651
c	4	1 1/2"	43'0" 899
c	4	1 1/2"	36'6" 776
d	8	1 1/2"	39'3" 1665
e	4	1 1/2"	37'3" 127
g	94	1"Ø	14'0" 1119
Reinforcing Steel Lbs 1076			
Concrete Class A Molds 78			
Plates & Bolts Lbs 119			

PROJECT No. _____
COUNTY _____

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION
RALEIGH
STANDARD
REINFORCED CONCRETE
THROUGH GIRDER
35'0" SPAN 20'0" ROADWAY
SEPTEMBER 1922

SUBMITTED BY W. L. Brown BRIDGE ENGINEER
APPROVED BY Chas. E. Shaw DATE 1/2/22
STATE HIGHWAY ENGINEER

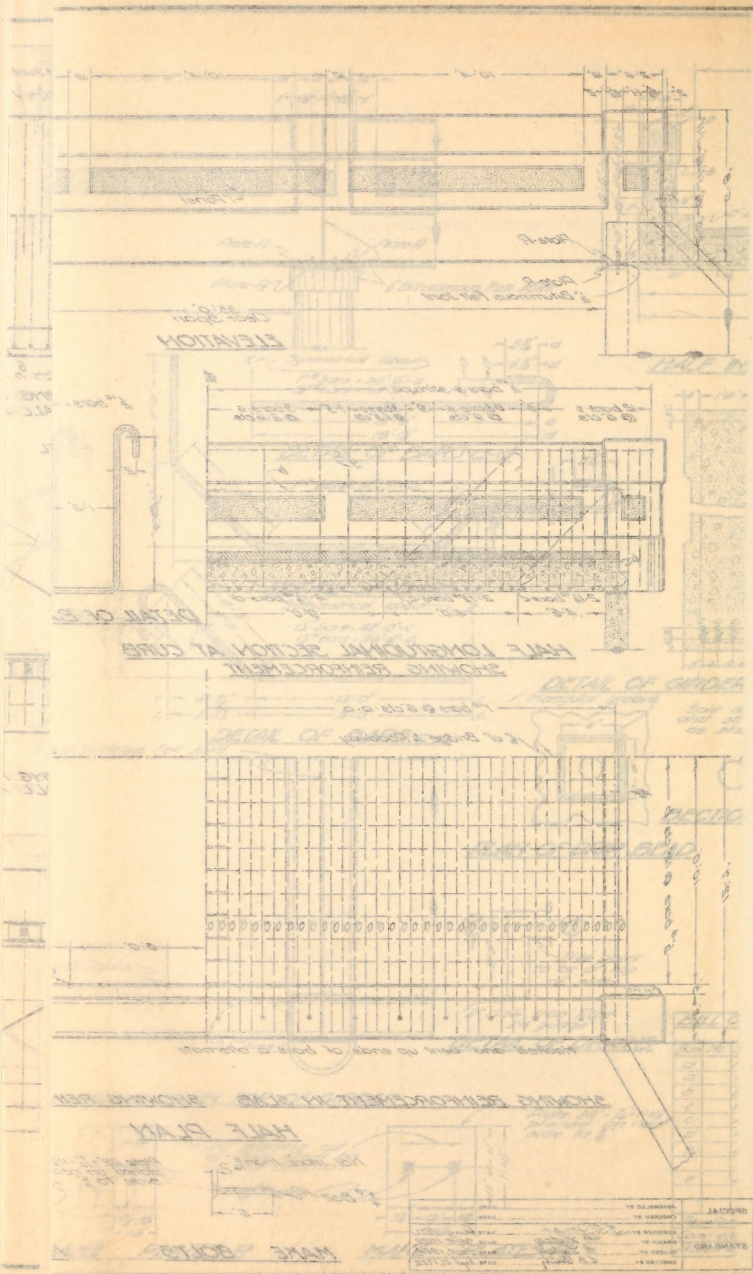
PLAN NO.

SPECIAL	ASSEMBLED BY	DATE
	CHECKED BY	DATE
STANDARD	DESIGNED BY	DATE
	DRAWN BY	DATE
	TRACED BY	DATE
	CHECKED BY	DATE

MAKE BOLTS

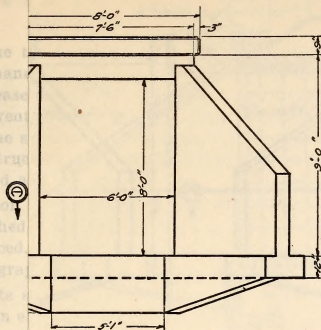
MAKE PLATES-P.

MAKE PLATES-F

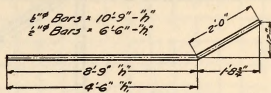


DESIGNED BY	DATE
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APPROVED BY	DATE
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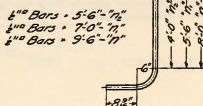
FED. ROAD DIST. NO.	STATE	FED. ROAD PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
10	N.C.				



SIDE ELEVATION



DETAIL OF BARS h & h₁



DETAIL OF BARS n, n₁, & n₂

DESIGN DATA:

Specifications N.C. State Highway Com.
Assumed live load: Two typical 15T. trucks passing
Maximum height of fill: 8'-0"
Weight of fill: 100 lbs. per cu. ft.
Steel in tension 16,000 lbs. per sq. in.
Concrete in compression 6500 lbs. per sq. in.
Concrete in shear 40 lbs. per sq. in.
Hel area of steel $\frac{1}{4}$ " = 0.196 sq. in.
 $\frac{3}{8}$ " = 0.250 sq. in.
 $\frac{1}{2}$ " = 0.307 sq. in.

GENERAL NOTE:

Class A concrete to be used throughout
Proportions 1:2:4
Maximum size of aggregate 1½"
All reinforcing steel shall be deformed bars. Square twisted bars are not to be considered as deformed bars.
All dimensions relative to reinforcement are to centers of bars.
Where splicing of bars is necessary bars are to be lapped 40 diameters.
Exposed surfaces of curbs and wing walls are to be brushed out with stiff bristle or wire brushes.
No cement wash will be permitted.
All corners to be chamfered ¾"
All materials and workmanship as per specifications of the N.C. Highway Commission

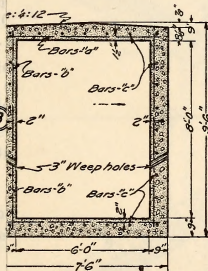
PROJECT NO.

COUNTY

STA. NO.

DESIGN NO.

ELEVATION
OF WING



ELEVATION OF BARREL C-C

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION

STANDARD
6'-0" x 8'-0"
REINFORCED CONCRETE
BOX CULVERT

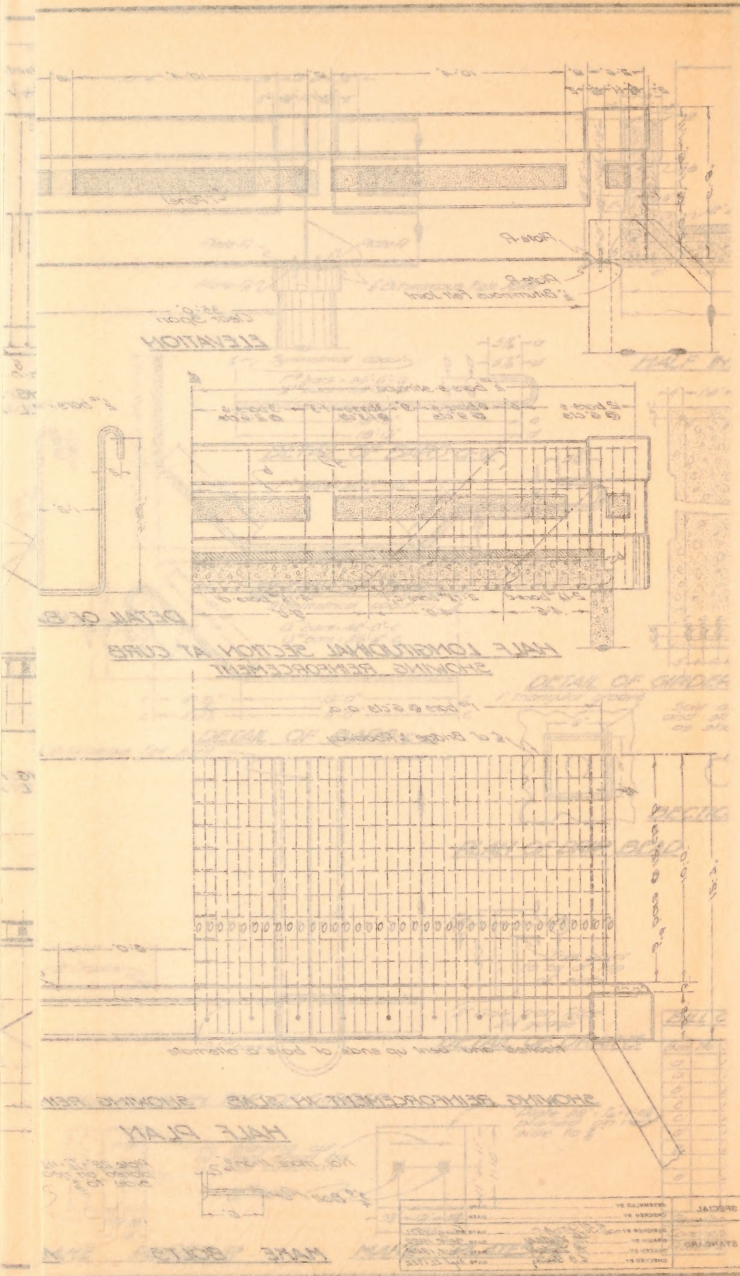
JANUARY 1922

SCALE 3"=1'-0"

SUBMITTED BY: W. L. Brown, BRIDGE ENGINEER
APPROVED BY: Chas. Upshaw, DATE: 7/16/22
STATE HIGHWAY ENGINEER

PLAN NO.

STANDARD NO. 1006.



ELEVATION

HALF LONGITUDINAL SECTION AT CURB
SHOWING REINFORCEMENT

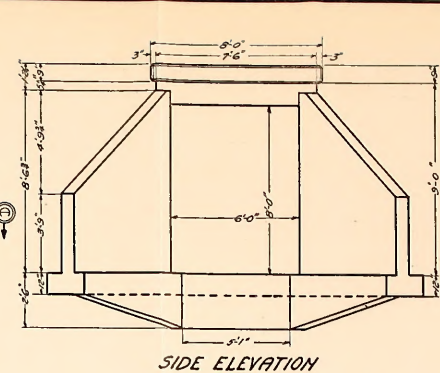
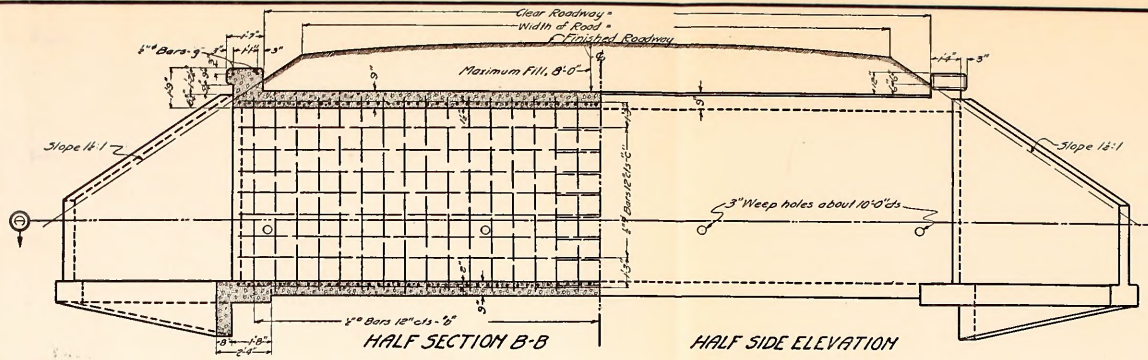
DETAIL OF GIRDER

DETAIL OF JOINT

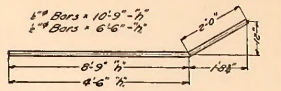
HALF PLAN

SHOWING REINFORCEMENT AT CURB

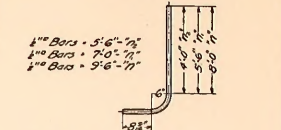
DESIGNED BY	DATE
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APPROVED BY	DATE
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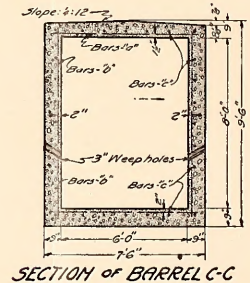
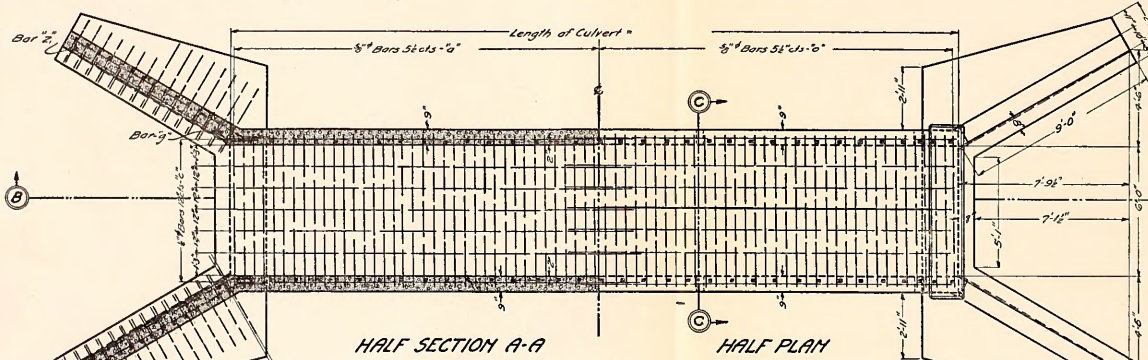
REV. NO.	DATE	REV. NO.	DATE	REV. NO.	DATE
10	H.C.				



DETAIL OF BARS h, i, & j



DETAIL OF BARS n, o, & p

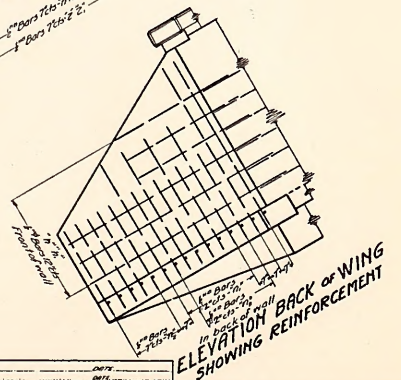


SECTION OF BARREL C-C

DESIGN DATA:
 Specifications H.C. State Highway Com.
 Assumed live load: Two typical 15T Trucks passing.
 Maximum height of fill: 8'-0"
 Weight of fill: 100 lbs per cu ft.
 Steel in tension: 16,000 lbs per sq in.
 Concrete in compression: 6500 lbs per sq in.
 Concrete in shear: 400 lbs per sq in.
 Net area of steel: 1.4 - 0.156 sq in.
 1/2" = 0.250 sq in.
 3/4" = 0.307 sq in.

GENERAL NOTE:
 Class B concrete to be used throughout.
 Proportions 1:2:4.
 Maximum size of aggregate: 1 1/2".
 All reinforcing steel shall be deformed bars. Square twisted bars are not to be considered as deformed bars.
 All dimensions relative to reinforcement are to centers of bars.
 Where spacing of bars is necessary bars are to be lapped 40 diameters.
 Exposed surfaces of curbs and wing walls are to be brushed out with stiff bristle or wire brushes.
 No cement wash will be permitted.
 All corners to be chamfered 1/2".
 All materials and workmanship as per specifications of the H.C. Highway Commission.

PROJECT NO.
COUNTY
STA. NO. **DESIGN NO.**



ELEVATION BACK or WING
 SHOWING REINFORCEMENT

DESIGN NO. 1

BILL OF MATERIAL			
LENGTH OF CULVERT 32'-8"			
Bars No.	Size	Quantity	Weight
a	1/2"	71.3	107.4
b	1/2"	9.0	50.5
c	3/4"	17.3	69.5
d	1/2"	7.6	40
e	1/2"	10.9	144
f	1/2"	6.6	69
g	1/2"	5.6	65
h	1/2"	7.0	95
i	3/4"	5.6	168
j	3/4"	2.3	69
k	3/4"	3.6	95

Reinforcing Steel - Lbs 2969
 Concrete - Cu Yds 42.3

DESIGN NO. 2

BILL OF MATERIAL			
LENGTH OF CULVERT			
Bars No.	Size	Quantity	Weight
a	1/2"		
b	1/2"		
c	1/2"		
d	1/2"		
e	1/2"		
f	1/2"		
g	1/2"		
h	1/2"		
i	1/2"		
j	1/2"		
k	1/2"		

Reinforcing Steel - Lbs
 Concrete - Cu Yds

DATE	REVISION BY	DATE

Concrete in head and wing walls - 143 cu yds
 Concrete per foot of barrel - 85 cu yds
 Steel per foot of barrel - 681 lbs
 Steel in head and wing walls - 1945 lbs

STATE OF NORTH CAROLINA
 STATE HIGHWAY COMMISSION
 STANDARD
 6'-0" x 8'-0"
 REINFORCED CONCRETE
 BOX CULVERT
 JANUARY 1922 SCALE 3/4"=1'-0"

APPROVED BY: [Signature] DATE: 1/1/22
 DRAWN BY: [Signature] DATE: 1/1/22

PLAT NO.

Due to the increase in motor vehicles traffic and the policy of building permanent structures on the State system of highways, it was decided to increase the width of roadway on drainage structures from eighteen feet to twenty feet and design these structures for two fifteen-ton trucks passing on the structure. This necessitated revising our standard drawings both for substructure and superstructure. These standards are now practically completed and are in use.

Upon investigation it was found that by having these standards lithographed, the cost of both preparing plans and blue-printing could be reduced. At the present time the majority of these standards have been lithographed and the rest are practically ready for use.

Cuts showing the typical design of the various structures now in use are shown elsewhere in this report.

Drafting Room

During the period covered by this report plans have been prepared and contracts let for the following structures:

<i>Reinforced Concrete:</i>	<i>Contract Price</i>
292 bridges over 20' 0" span and 1,664 bridges and culverts of 20' 0" span or less	\$4,230,947.79
<i>Steel:</i>	
23 bridges over 20' 0" span and 4 bridges of 20' 0" span or less	447,039.30
<i>Steel and Concrete:</i>	
7 bridges over 20' 0" span.....	420,113.02
<i>Timber:</i>	
1 bridge over 20' 0" span.....	5,093.00
Total	\$5,103,193.11

Summing up the above we find that plans have been prepared and contracts let for:

1956 Reinforced concrete structures.....	\$4,230,947.79
27 Steel structures	447,039.30
7 Steel and reinforced concrete structures...	420,113.02
1 Timber structure	5,093.00
<hr/> 1991	<hr/> \$5,103,193.11

Maintenance of Existing Structures

Realizing that it would be some time before it would be possible to replace all the old steel and wooden structures on the State System of Highways with modern concrete structures, it was decided that by repairing the wooden structures and painting and repairing the steel structures it would be possible to make these structures safe for traffic for a number of years.

The repairing and painting of the larger wood and steel structures are now being done by the Bridge Department.

To accomplish this work, four forces were put in the field, two primarily for painting but which also could do light construction work, and the other two for heavy construction. As this work of course necessitated moving from place to place, trailers fitted up as living quarters were provided for the men. In addition, one or two trucks, a tool car, and the necessary

equipment, such as air compressors, sand blasts, pile drivers, etc., were added as required. Surplus material secured from the U. S. Government was used as much as possible, and the remodeling done at the truck field. The cost of the various outfits was very reasonable.

Order of Work

Upon the completion of the field inspection by the Bridge Maintenance Engineer, a report is submitted to the Bridge Engineer with recommendations and an estimate of cost of the contemplated repairs. Upon the approval of the recommendations, work is started.

In order to keep track of progress and cost of each job a "Daily Report" is sent in by each foreman, showing the daily payroll, material received or bought, the work done, and also the distribution to the various units. Upon the completion of each job a final report is made giving a description of the repairs made and the total and detailed costs. A monthly report is also made covering the work done during that period. In order to keep a graphical record of the jobs contemplated, under construction and completed, and also the location of the various forces, a large map of the State was mounted on which the status of the various jobs and forces is shown by different colored pins.

Summary of Costs

In the following table a summary is given of the cost of the work done by the various forces:

Items	Force 1	Force 2	Force 3	Force 4	Totals
Date Organized					
(started out):					
	11-12-21	11-30-21	12-13-21	3-16-22	
Cost of jobs finished...	\$10,820.51	\$7,234.39	\$ 7,386.45	\$5,362.32	\$30,823.67
Total wages paid to date	6,220.66	5,475.38	6,398.12	2,718.17	20,812.33
Total material bought.	4,858.50	6,964.76	6,454.22	2,464.54	20,742.02
Total Misc. Expense...	622.13	701.86	512.72	419.00	2,255.71
Total Burden Charge..	4,486.22	4,177.91	4,146.81	1,652.14	14,463.08
Deprec. on Equip. Chgd.	819.62	783.58	783.16	113.41	2,499.77
Int. earned on Invtmt.	276.91	299.01	325.42	11.23	912.57
Cost of Orig. Equip....	3,529.39	3,568.43	3,527.10	516.70	11,241.62
Cost of Pres. Equip....	3,592.49	3,569.43	3,537.10	616.70	11,315.72
Cost of Orig. Machinery	4,709.85	5,767.00	10,590.00	2,000.00	23,066.85
Cost of Pres. Machinery	7,855.85	3,067.00	10,775.00	2,550.00	24,247.85
Cost of Orig. lot of tools	203.65	283.13	208.80	245.92	941.50
Cost of Pres. lot tools..	580.42	419.48	433.69	409.39	1,842.98
Total Orig. Investment.	8,442.89	9,618.56	14,325.90	2,862.62	35,249.97
Total Pres. Investment.	12,028.76	7,055.91	14,745.79	3,576.09	37,406.55
No. of jobs completed..	28	5	11	4	48

The jobs covered by the above range in size from short I-Beams and wood spans to steel structures several hundred feet in length.



QUARTERS OF FLOATING MAINTENANCE GANG
(BUILT OF SURPLUS WAR MATERIAL)

DEPARTMENT OF LOCATION

The State Highway Commission established a Department of Location in the spring of 1922, with head office at Raleigh, and placed the preliminary and location surveys under its supervision. Prior to this time all surveys were made under the direction of the District Engineers, each District having its own locating parties.

Organization and Duties

The organization is shown on the accompanying chart. The department is under the direction of a Principal Locating Engineer, who has headquarters at Raleigh, and reports to the State Highway Engineer.

A Locating Engineer is assigned to each of the three topographic sections of the State, the Coastal, Piedmont and Mountain, with headquarters centrally situated in each.

The Locating Engineers have been carefully chosen for their experience in the class of work peculiar to their respective sections. The heavier grading in the Mountain Section requires topographic field work and mapping, and the projection of location on contour maps. The Coastal Section requires an engineer not only familiar with the drainage and soil characteristics of a low country, but one capable of organizing parties for rapid progress, as the question of maximum grades rarely enters the problem. The Piedmont Section partakes of the characteristics of both of the others, usually without the extremes of either. The Locating Engineers are responsible for the efficient organization of the field parties, and the reduction of preliminary survey work to a minimum by making reconnaissances ahead of the parties to eliminate surveys of routes not feasible. They supervise the work of the survey parties in their respective sections, and report to the Principal Locating Engineer.

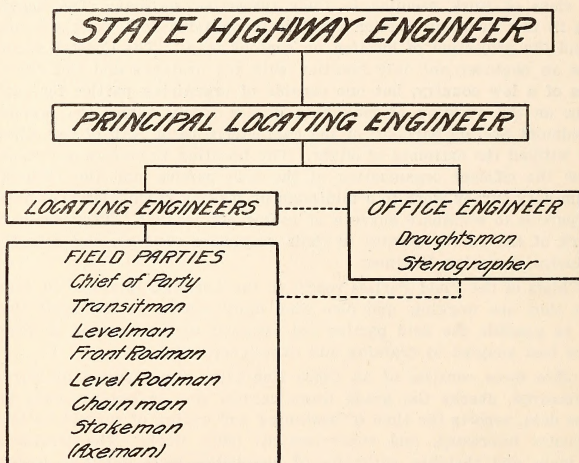
The Chiefs of the Field Parties report to the Locating Engineer in whose District they are working, and also send daily reports to the head office. As far as possible the field parties are assigned to the sections to which they are best adapted by training and experience.

The office force consists of an Office Engineer, who inspects all survey notes received, checks the grade lines, curves, etc., makes up costs and progress data, reports the time of beginning and ending of surveys to other departments interested, and supervises all office work. The Draftsman makes maps and sketches, estimates of quantities, plots monthly progress and other charts, and checks salary and expense vouchers.

The Principal Locating Engineer draws up reports on the relative merits and costs of alternative surveys; investigates the objections or suggestions of property owners affected by the surveys; issues instructions both general and special for the use of the field parties in order to standardize the work, and promptly calls attention to failures to comply with instructions. The monthly progress of each party is charted, and each month the cost of surveys per mile is determined. This affords a comparison of the work in the different sections and of the various parties. Constructive criticisms and suggestions are made to the Locating Engineers when parties fail to make requisite progress or exceed normal costs.

The Location Department has advisory contacts with the Roadway Department, the Bridge Department, and the District Engineers. No surveys are passed as final until they have had the approval of the District Engineer and the Principal Locating Engineer.

ORGANIZATION CHART DEPARTMENT OF LOCATION



An important function of the Department is the investigation of railroad crossings. All over- and undergrade situations are taken up with the Railroad Company and prosecuted until a final agreement is reached as to

~ DEPARTMENT OF LOCATION ~

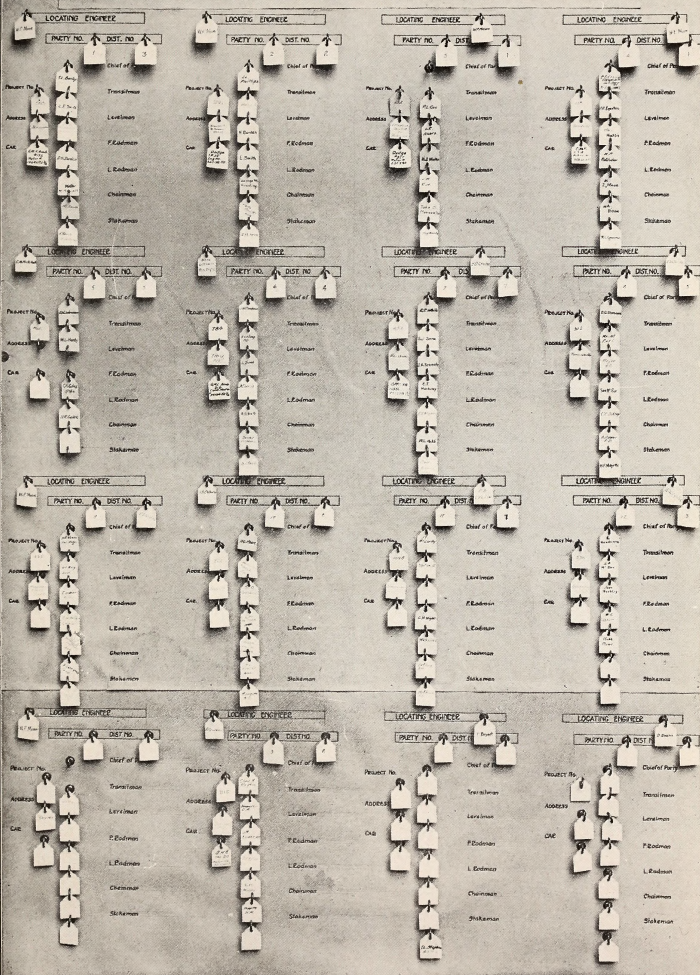


CHART USED AS RECORD OF PARTIES: DEPARTMENT OF LOCATION

the alignment, characters of structure, and clearances. This usually requires two examinations on the ground by the representatives of the parties interested. The large number of crossings in the State makes this particular work one of considerable magnitude.

Department Operations

"The 1,000 miles in 1922" program required a material expansion of forces in all departments. The number of survey parties was augmented to 17 in May, with an output of 160 miles per month. When the attainment of the program is assured a gradual reduction will be begun.

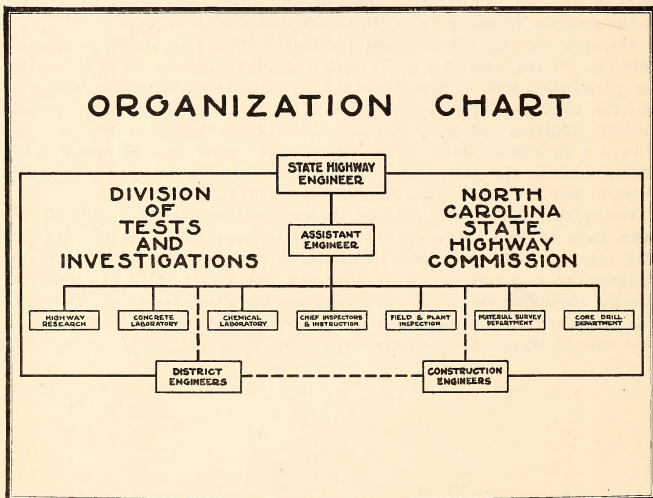
Averages for the different sections month by month reveal a gradual reduction in the cost of surveys and a gradual increase in the mileage per party, the result of constant attention to organization, standardization, and the advantage of keeping parties on one class of work. The average monthly progress per party was 6.7 miles at the beginning of the year, with a 4 to 5 man party. The personnel per party was increased to 7, adding 25% to the party cost, but the monthly progress advanced to 9.7 miles, or 45% increase for the three months ending June 30th.

Among the charts used, the one shown here has greatly facilitated the office work by supplying a ready reference to personnel of the field parties. The constant shifting to new locations, with transfer of party members, resignations, and employment of new men, interchange of cars or trucks, require some flexible means of keeping an up-to-date record in the office. The tags hung on the board can be readily changed to the proper hook to take care of all the above conditions.

DIVISION OF TESTS AND INVESTIGATIONS

The rapidity with which the work was put under construction after the new bond issue was authorized required that the facilities for proper testing, supervision and control of materials be completed as soon as possible.

The Division of Tests and Investigations consists of seven departments, as shown by the following chart:



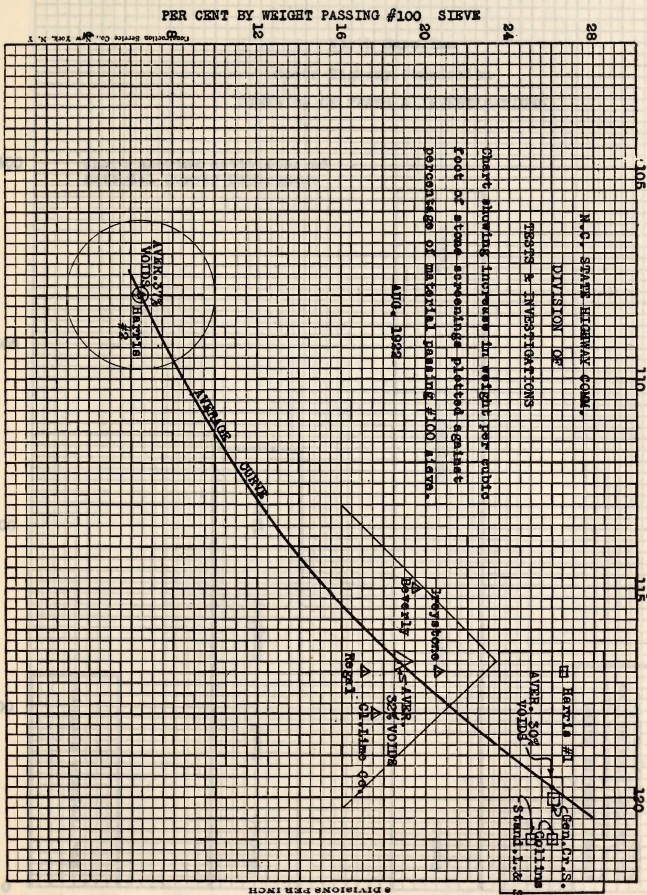
Considering the Division as a whole, its activities commence with the authorizations of the road survey and end when the given project is accepted by the State and the final estimate paid. It keeps in touch with the construction through the Construction and District Engineers and Chief Inspectors, and with the materials entering into the construction through the different departments of the Division.

The activities of the different departments are co-ordinated under the general office system, which also keeps all records and reports during the progress of construction. By this system it is possible to standardize construction methods and control of materials in accordance with the policy of the Highway Commission.

Concrete Laboratory

A two-story brick building, 40' x 60', was erected beside the Mechanical Department at Method, and is known as the Concrete Laboratory. The physical tests of all non-bituminous materials are made here, which

WEIGHT PER CUBIC FOOT OF STONE SCREENINGS
REDUCED TO COMPARATIVE BASIS OF SP. GR. - 2.75.



TYPICAL CHART SHOWING PRELIMINARY DETERMINATIONS IN FIVE AGGREGATE INVESTIGATIONS

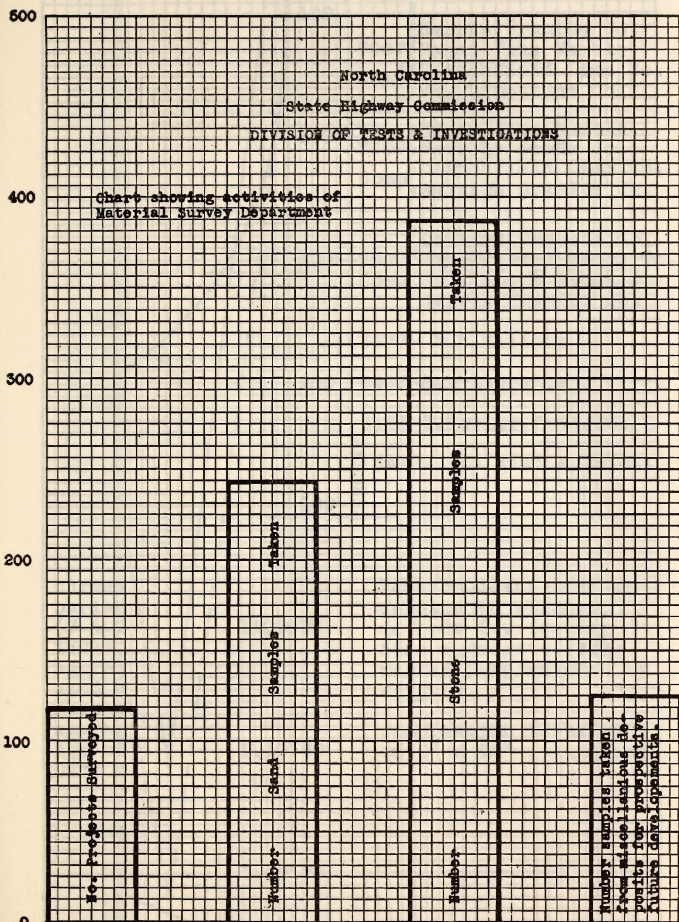
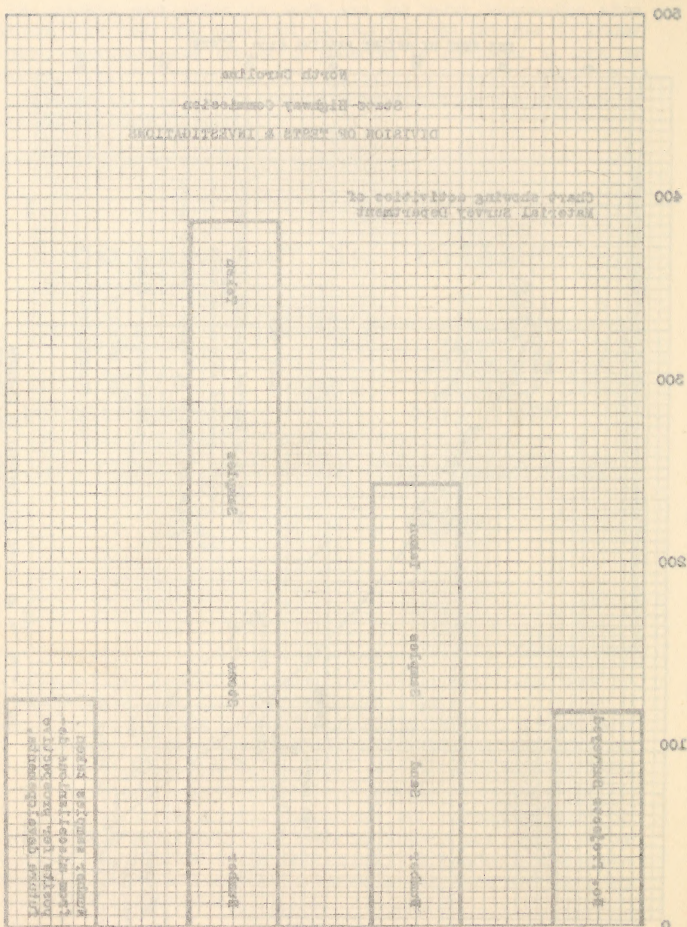


CHART SHOWING ACTIVITIES OF MATERIAL SURVEY DEPARTMENT

CHART SHOWING ACTIVITIES OF MATERIAL SURVEY DEPARTMENT



Sand
6455

Sand
6478

SOURCE OF MATERIAL SUPPLY

6924--Harris Granite

5987-From Proj. 906

Harris Granite Co.
7907 Regal Blue Marble
Climchfield Lime Co.
Comp Va. Limestone Co.

Regal Blue Marble
7909 Beverly Stone Co.
Climchfield Lime Co.
Comp Raleigh Granite Co.

Collins Granite Co.
7908 Gen. Crushed Stone Co.
Comp Std. Lime & Stone Co.
Harris Granite Co.

5477- F.W.Elliott

5456-Sam Lawrence

5455-J.Fowler, Proj. 455

5478- Std. Sand & Gravel

N.C

TEST

PIRCE

Curves
pariso
(7 & 2
1:2:4
aggreg
sand &
Also b
aggreg
Age of
Damp c

App

Tension Tests made ac-
cording to standard
methods for testing
fine aggregate (1:3
mortar proportioned by
weight).

Compression tests made
on 6" x 12" cylinders.

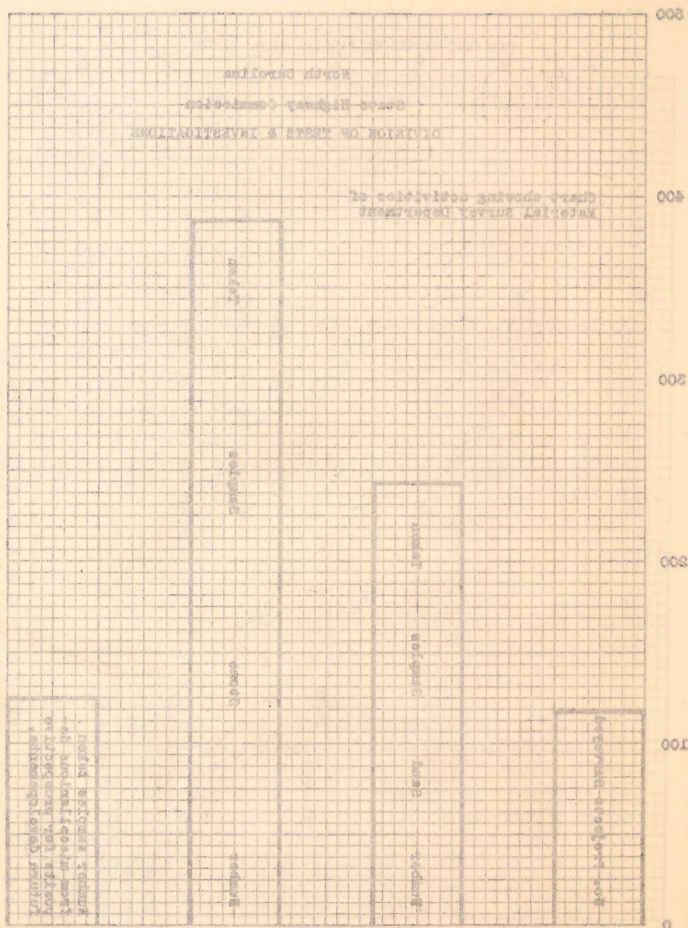
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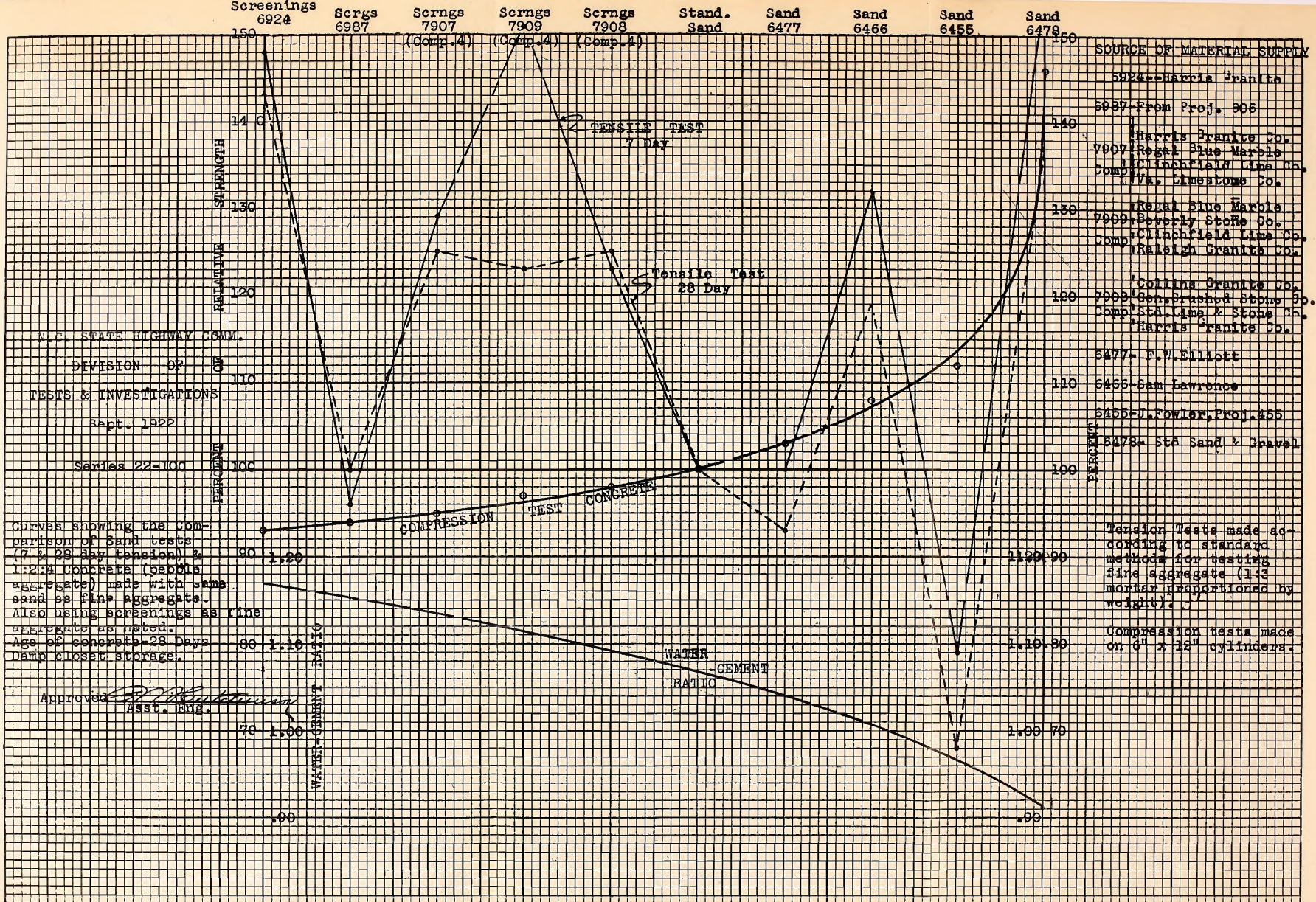
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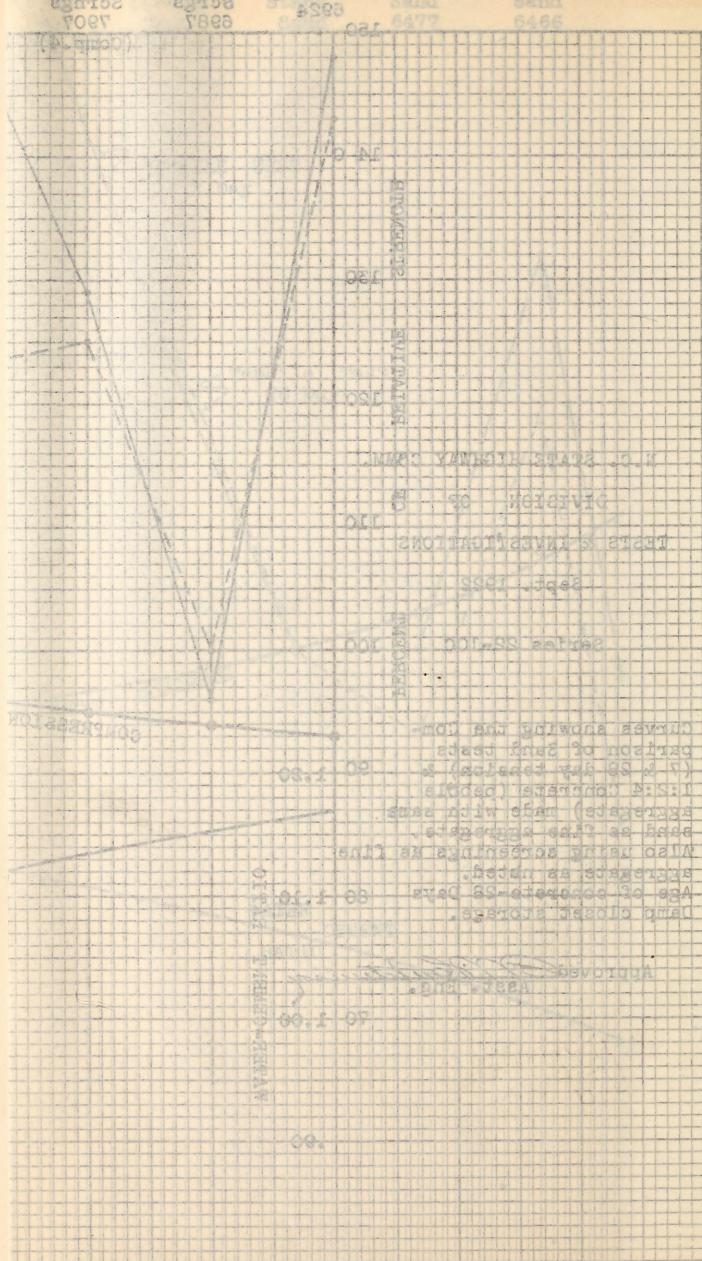
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CHART SHOWING ACTIVITIES OF MATERIAL SURVEY DEPARTMENT

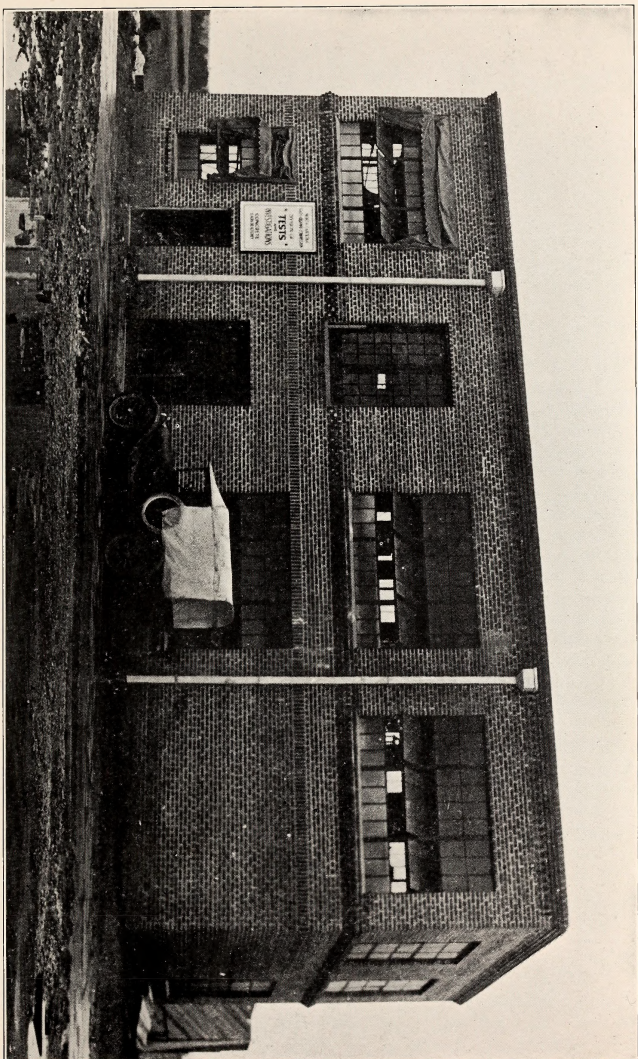




TYPICAL CHART OF FINE AGGREGATE INVESTIGATIONS

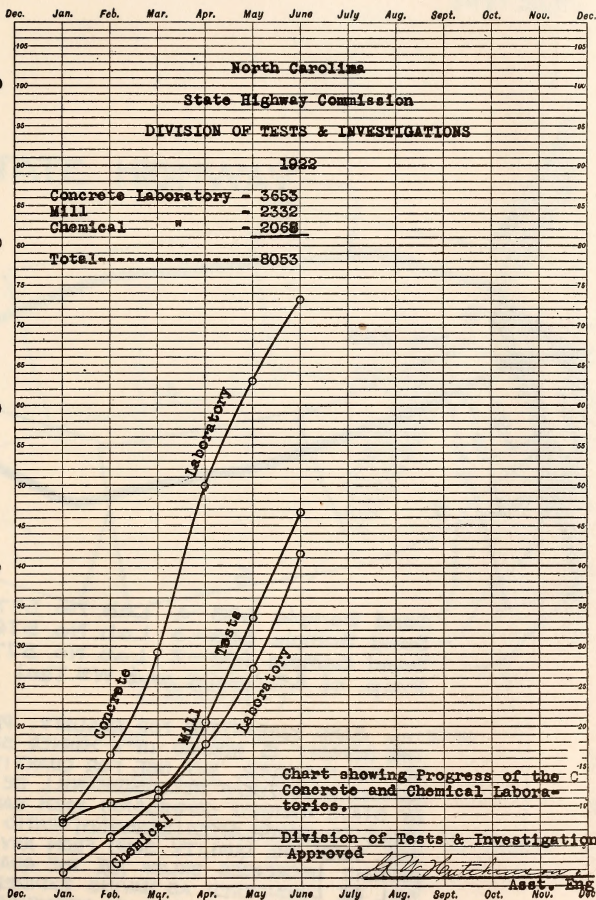


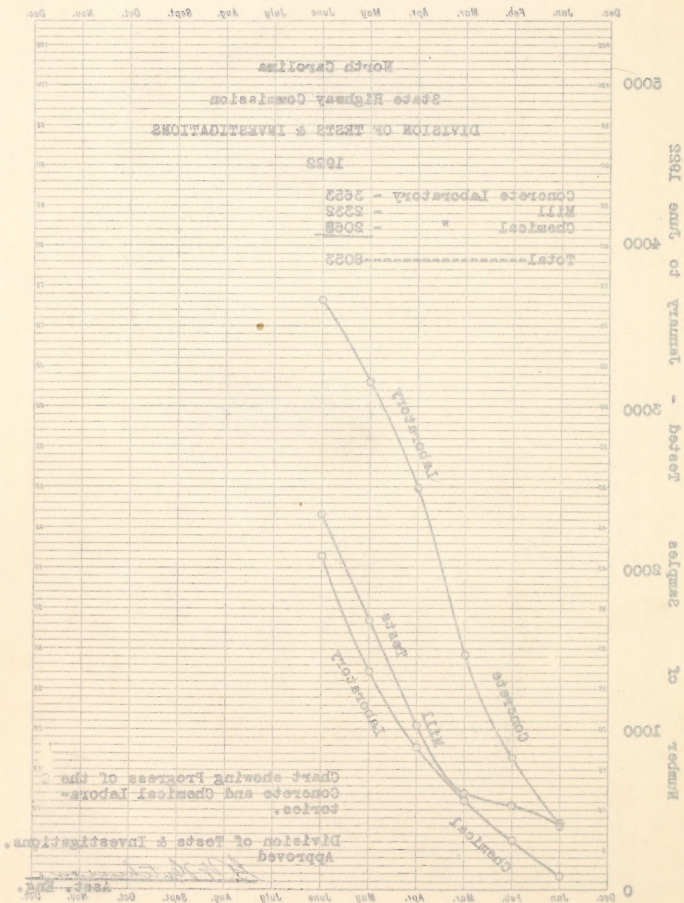
TYPICAL CHART OF FINE AGGREGATE INVESTIGATIONS



CEMENT TESTING LABORATORY

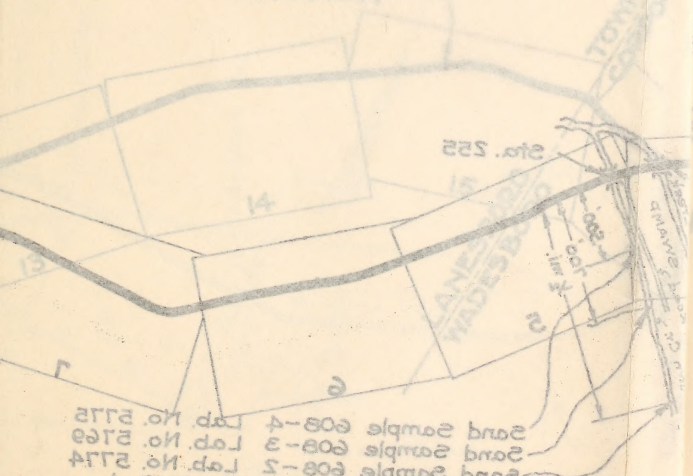
Number of Samples Tested - January to June 1922





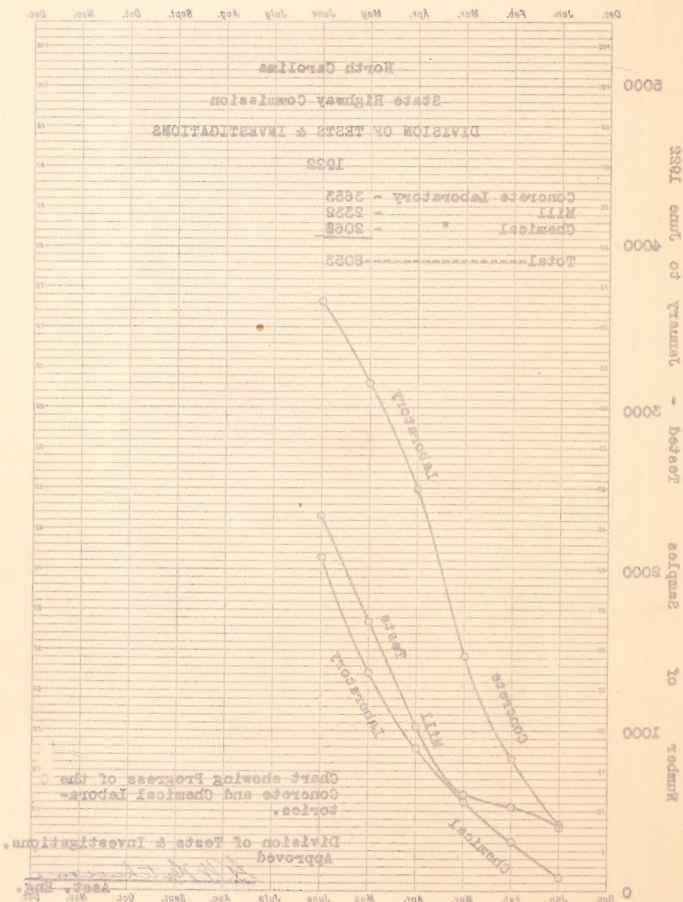
PROJECT
DIVISION

STATE HIGHWAY

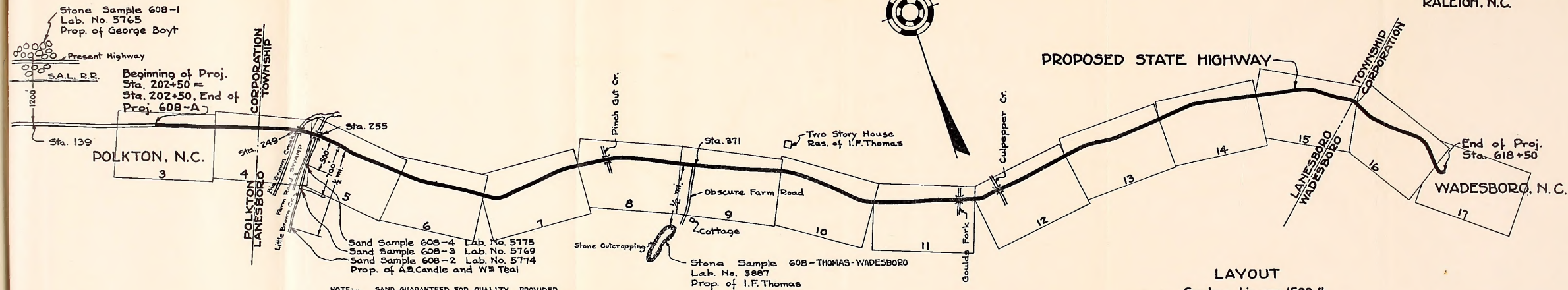


Prop. of A.C. and W. T. C. L.
Sand sample 608-2 Lab. No. 5774
Sand sample 608-3 Lab. No. 5769
Sand sample 608-4 Lab. No. 5775

NOTE: -- SAND GUARANTEED FOR QUALITY. PROVIDED THE DEPOSIT IS WORKED IN A MANNER SATISFACTORY TO THE ENGINEER, BUT NOT FOR QUANTITY. ANY CEMENT ADJUSTMENT NECESSARY WILL BE BORNE BY STATE HIGHWAY COMMISSION WHEN SAND FROM DEPOSITS SHOWN GIVES STRENGTH RATIO OF OVER 75%. WHEN THE QUALITY SAND FROM ANY LOCAL DEPOSIT DECREASES BELOW 75% THE QUANTITY WILL BE CONSIDERED AS HAVING EXPIRED. SEE LOCAL SAND REQUIREMENTS IN SPECIFICATIONS.



PROJECT 608 — ANSON COUNTY
DIVISION OF TESTS & INVESTIGATIONS
RALEIGH, N.C.



NOTE:-- SAND GUARANTEED FOR QUALITY. PROVIDED THE DEPOSIT IS WORKED IN A MANNER SATISFACTORY TO THE ENGINEER, BUT NOT FOR QUANTITY. ANY CEMENT ADJUSTMENT NECESSARY WILL BE BORNE BY STATE HIGHWAY COMMISSION WHEN SAND FROM DEPOSITS SHOWN GIVES STRENGTH RATIO OF OVER 75%. WHEN THE QUALITY SAND FROM ANY LOCAL DEPOSIT DECREASES BELOW 75% THE QUANTITY WILL BE CONSIDERED AS HAVING EXPIRED. SEE LOCAL SAND REQUIREMENTS IN SPECIFICATIONS.

LAYOUT
Scale : 1 in. = 1500 ft.
Length = 7.877 mi.
Material Sketches Not to Scale

PROJECT 608 — ANSON COUNTY OF TESTS & INVESTIGATIONS RALEIGH, N.C.

Stone Sample 608-1
 Lab. No. 2765
 Prop. of George Boyt

Present Highway

Beginning of Proj.
 Sta. 205+20 =
 Sta. 205+20, End of
 Proj. 608-A

S.A.L. R.R.

MOITAGAGAGT
 gihswot

WADESBO
 BOG-KYJOG

End of Proj.
 POLKTON, N.C.

WADESBO, N.C.

17

Sta. 139

Sta. 139

Sta. 139

Sta. 139

Old Quarry
Stone Sample 614-10
Lab. No. 3525
Prop. of A.K. Wolfe

CONCORD COUNTY

Buffalo Creek

End of Proj.
Sta. 486+00



Stone Sample 614-3
Lab. No. 3190
Prop. of J. H. Wolfe
Stone Sample 614-2
Lab. No. 3517
Prop. of C. S. Williams

See
Len
Material

PROJECT 608 — ANSON COUNTY

OF TESTS & INVESTIGATIONS

RALEIGH, N.C.

Stone Sample 608-1
Lab. No. 2762
Prop. of George Boyt

Present Highway

S.A.L. R.R.

Beginning of Proj.
Sta. 205+20 =
Sta. 205+20, End of
Proj. 608-A

End of Proj.
POLKTON, N.C.

WADESBORO, N.C.

RALEIGH, N.C.

WADESBORO, N.C.

Sta. 205

Sta. 139

Sta. 205

Sta. 205

Sta. 205

Sta. 205

PROJECT 614
CABARRUS COUNTY

Beginning of Proj. Sta. 0+00

Old Quarry
Stone Sample 614-10
Lab. No. 3222
Prop. of J.K. Wolfe

MECKLENBURG
CABARRUS

Sheet No. 3

4

Sta. 80

Present Road

Garage Stores

Station

Back Creek

To Charlotte

So. R.R.

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Sand Sample 614-9
Lab. No. 3217
Prop. of C.F. Simms

Stone Sample 614-8
Lab. No. 3223
Prop. of Chas. A. Smith

Stone Sample 614-6
Lab. No. 3213
Prop. of A.J. Staugh and S.J. Ervin

Stone Sample 614-3
Lab. No. 3199
Prop. of J.L. Hudson

Sand Sample 614-4
Lab. No. 3202
Prop. of Henry Winecoff

PROPOSED STATE HIGHWAY

PROJECT 614 — CABARRUS COUNTY
DIVISION OF TESTS & INVESTIGATIONS
CONCORD, N.C. RALEIGH, N.C.

LAYOUT

Scale: 1 in. = 2000 ft

Length = 9.205 mi.

Material Sketches Not to Scale.

PROJECT 614 — CABARRUS COUNTY
CABARRUS COUNTY

Beginning of Proj. Sta. 0+00

MECKLENBURG
CABARRUS

Branch

Three Mile Branch

Sand Sample 614-4
Lab. No. 3202
Prop of Henry Winecoff

LAYOUT

1 in. = 2000 ft

gth = 9.205 mi.

Sketches Not to Scale.

include the testing of cement, sand, stone, pebbles, concrete, steel, water, culvert pipe and clays or gravels for sand-clay and gravel road work.

This department has one of the best equipped laboratories of its kind in the country and has put into use several practical methods of minimizing the personal equation which exists in this class of work. The methods used are the most modern in every respect and the utmost care is exercised to keep the conditions uniform for all tests. Among the refinements in test methods are the use of the flow table for the determination of the proper consistency for sand-cement mixtures; recording thermometers control of water storage baths; and humidity and temperature control of the moist closet for the storage of concrete specimens.

Probably the greatest step forward in the economic use of material available in different parts of the State for highway construction is the abandonment of the present standard test for sands, which is in part a strength test of the sand mortar, for a determination of the quality of concrete a given sand will make when it is used as fine aggregate in the mixtures actually proposed for use in the field. North Carolina does not possess many natural sands which will pass the present sand test but the new method will enable a much more intelligent determination of the relative quality of local sands encountered and effect considerable saving in cost. It will mean that where it is now necessary to import sands in many cases, on account of the local material failing to pass the present standard requirements, local material will be found by testing it in concrete to make as good and sometimes better concrete than the imported material. The lack of economy in the present sand test has long been realized by those familiar with field conditions and North Carolina is among the first State organizations to realize the situation and take advantage of the savings which result.

Considerable research work is necessary to secure economic results in the field and this is carried on in the concrete laboratory as the problems arise.

Chemical Laboratory

The Chemical Laboratory began to function about the middle of January, 1922. It is fully equipped to carry on the necessary tests for analysis and control of highway work, and is located in the main office building of the Commission.

The major portion of the work carried on consists of the control of bituminous surface mixtures including the quality of the materials and the proportions of the mixtures.

Daily routine analysis of the bituminous surfacing on every project is carried on so that any irregularity can be instantly adjusted.

One of the most important determinations for the quality of the bituminous surface is the so-called density test. This test is made daily as the samples are received from the different projects and is of great importance as a guide in determining any variation of the mixture and the serviceability of the pavement.

In order that test results will be available, as soon as possible after they are received, it is necessary for day and night shifts to be operating

during the majority of the construction season. This saves duplication of equipment as well as obtaining definite control of the work in the field.

The Chemical Laboratory assists in training inspectors for the asphalt plant and field work by giving them a short course of instructions and then transferring them to the field forces for further instruction.

Field Inspection

The department of field inspection consists of authorized inspectors stationed at the source of production of all the major materials. Regardless of the type of material, it is tested or inspected at the point of production, wherever the amount of material shipped warrants the expense. The system affects practically all producers shipping to North Carolina for highway work, the exceptions being due to small or infrequent shipments, which are sampled and tested after being received on the work.

This department represents the Highway Commission at the cement, steel, stone, gravel, sand, bituminous material, culvert pipe and creosoted timber plants.

It is not a local proposition, as it extends to the States of South Carolina, Georgia, Alabama, Louisiana, Tennessee, Kentucky, Ohio, Pennsylvania, New York, New Jersey, Maryland and Virginia.

By this system of inspection, there are no delays on the work on account of the quality of the material received awaiting test for determination. It affords an economic means of guaranteeing that no inferior materials will be used and eliminates the expensive delays which would be unavoidable if central control was used, and prevents an unbalanced central organization which would be the result if this system was not used.

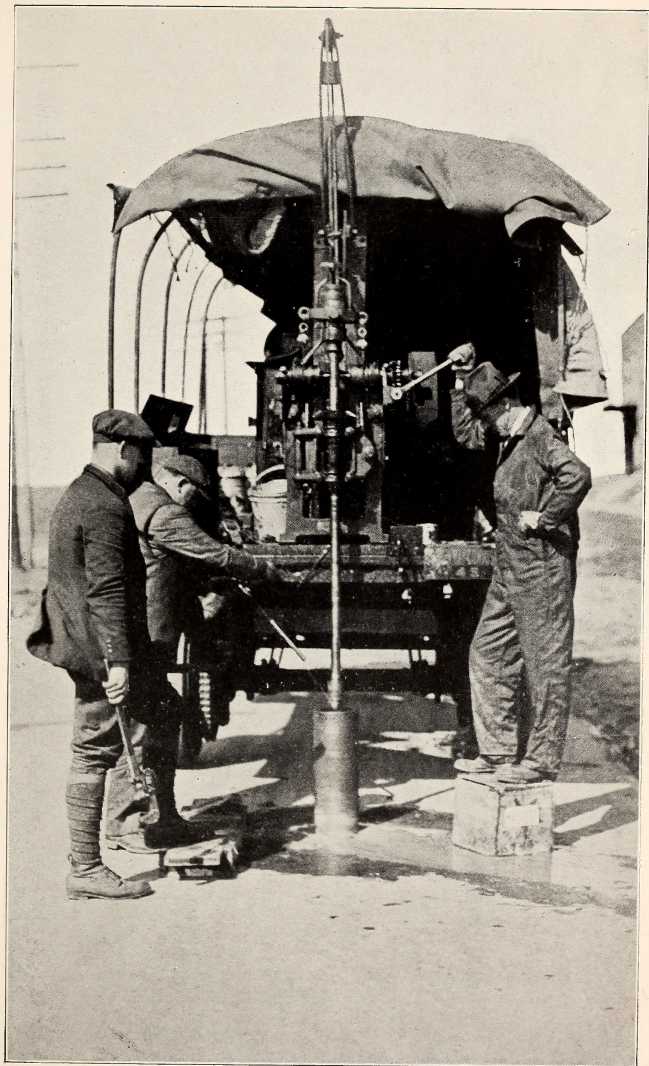
The intent is to keep as much as possible of this routine away from the central laboratories, but at the same time keep it under the control of the Division of Tests and Investigations and the results co-ordinated.

The standardization of the principal materials used is accomplished by chief inspectors who visit the different plants and regulate the inspection system so that the requirements will be enforced in the same way at all plants.

Material Survey Department

Hard-Surfaced Roads

At the beginning of the new hard-surface program it was realized that the demand by contractors for information regarding available materials would be tremendous and it was also necessary that local materials be used as much as possible for economic reasons. Accordingly, material survey parties were sent into the field to locate and sample all deposits of local materials within economic hauling distance of each project. The department has made material surveys of 116 projects. Samples of stone and sand were taken from each deposit and submitted to the concrete or chemical laboratory for tests. The findings of this department, coupled with the test results of the laboratories are available in convenient form for prospective bidders and have been of valuable assistance to them as well as directly being responsible for lowering the cost of the work. The



CORE DRILL CUTTING TEST SPECIMEN FROM HARD SURFACED ROAD

local deposits, if found desirable and operated by the contractor, are check tested at frequent intervals to prevent the use of inferior portions of the material as encountered.

Of the 116 projects surveyed about 20% are using local stone and about 75% are using local sand to a greater or lesser degree, depending on the quality and quantity located.

Highway Research Department

This department was organized to investigate the existing types of road construction and to carry on research regarding new types and the suitability of different types to different locations.

The work has included traffic census readings and wear measurements of top-soil and sand-clay roads; investigations of surface treatments on secondary highways; and the location of suitable material for all types of highways except those of hard-surface design.

Pavement Testing

Before final acceptance of any given project it is subjected to test by the pavement testing machine which drills specimens from the completed road. These specimens are sent to the Concrete or Chemical Laboratory and tested to determine the quality of the work, and is the best means of determining that the work has been carried on according to the specifications.

CONSTRUCTION ENGINEERS

In order that uniform requirements for a given type of construction be exacted of all contractors on State work and that a high standard of construction be followed out all over the State, a limited number of construction engineers were appointed at the reorganization of the Commission to supervise this phase of the work. The duty of these engineers, all of whom are experts in their respective lines, is to inspect, in company with the District Engineer or his Construction Engineer, the road and bridge work all over the State and to make recommendations for the betterment of the work to the field engineer, followed by a written report to the Chief Engineer.

On Monday of each week the Construction Engineers meet in conference with the Chief Engineer at which time the work of the past week is reviewed and plans made for the current week.

Each engineer in this department travels from 500 to 1,000 miles each week, visits an average of one and one-half districts, and makes from ten to fifteen separate reports. The results of system of inspection have been very satisfactory; the work has been standardized and a higher quality obtained; contractors are better satisfied since they know that the requirements are uniform throughout the State; and headquarters in Raleigh are kept in constant touch with field construction.

MAINTENANCE

Since the beginning of highway work under the supervision of the State Highway Commission in North Carolina the maintenance of roads has been given some consideration.

The plan whereby maintenance contracts were entered into between the State Highway Commission and the various counties by which the county road officials agreed to maintain certain State highways did not prove satisfactory. Some counties took advantage of this offer while others did not. Because of this no connected system of roads was established throughout the State.

It was not until the General Assembly of 1921 passed an act authorizing and directing the State Highway Commission to take over and maintain a State System of roads, which would be connecting from one end of the State to the other, that the counties were relieved of the further responsibility of maintenance.

Surveys for the State System of roads were made during March and April 1921, and a new organization effected May 1st under which the State was divided into nine districts with an engineer in charge of the maintenance in each district.

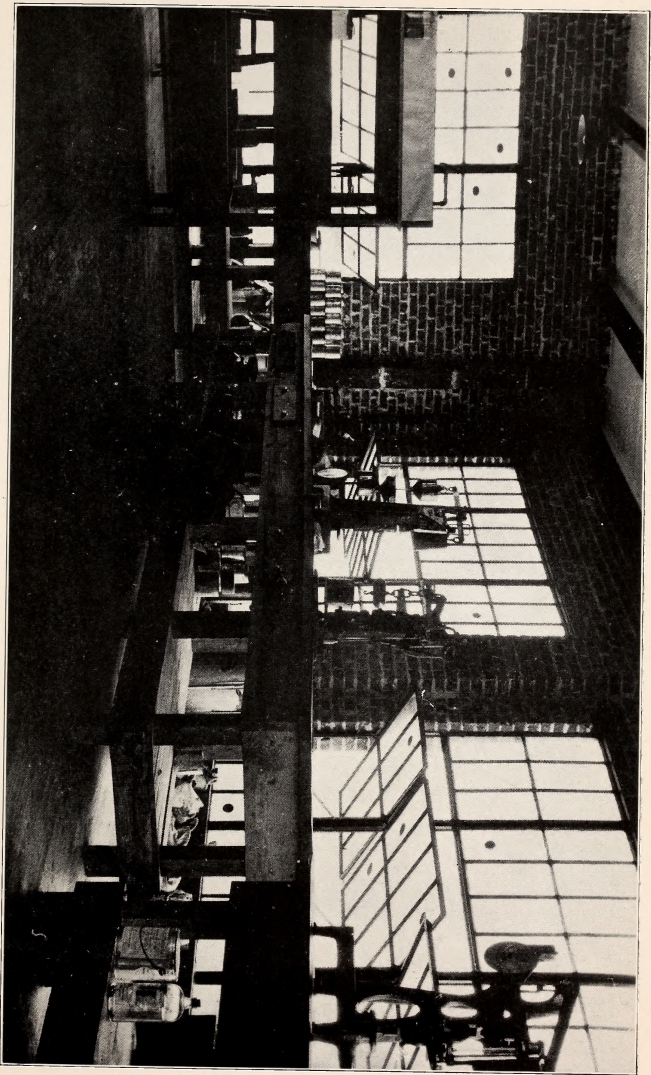
Each district was organized by dividing it into sections and appointing supervisors, there being from one to three to a district. The sections were organized by placing patrol gangs who would have charge of the upkeep and repair of from 15 to 25 miles of road.

As promptly as arrangements could be made, the State accepted for maintenance such roads that were agreed upon by the county officials and the State Highway Commission. Patrolmen were placed on these roads with equipment such as a truck, road machine, and drag, and instructions given them to shape and properly maintain the road. Outfits of 10 ton tractors and big road machines with scarifier attachments, were organized in each District, and these working in conjunction with the patrol gangs, accomplished good results in a short time.

Considerable difficulty was experienced at first in getting work under way in each district. Poor condition of the trucks, delay in delivery of equipment, personal investigation of each patrol established, and the inexperience of the men employed all caused delays.

Within a reasonable time these difficulties were overcome, and a system of roads put in shape and maintained in such a manner that the public could travel in all seasons of the year. Route mark signs, distance signs, curve signs, cross road signs and railroad crossing signs were erected on the roads at such places that the public were enabled to travel with more ease and freedom.

The maintenance work all over the State has progressed, and we are gradually making improvement on all the roads proposed on the State system. On those that no work has been done we expect to eventually improve, and in due time we will have a system of roads maintained that will be second to no State in the Union.



VIEW IN CEMENT TESTING LABORATORY

DISBURSEMENT OF STATE CONSTRUCTION FUND AND COLLECTION OF FEDERAL AID

When the Highway Commission was reorganized under the Act of March 3, 1921, and such of the activities of the engineering personnel as were related in some important characteristic or required identical machinery for their performance, were grouped into departments, to be operated separately, as the Locating, Bridge and Road, it was observed that there remained certain technical functions of the Chief Engineer, arising out of the contractual relations of the Commission, which could not properly be assigned as the duties of departments already created and which, on account of their ramification of detail, could not be administered by the Chief Engineer in person. The routine performance of these duties were, therefore, delegated to certain individuals designated assistant engineers and it is the purpose of this article to describe, briefly, several of the more significant of these duties.

Provisional and Final Estimates

The first of the duties mentioned originated in two paragraphs of the General Provisions of the Standard Contract. These paragraphs are:

No. 44. SCOPE OF PAYMENTS. The payments for each kind of work will be made on the basis of the approximate estimate by the Engineer, provided that the work is progressing to his satisfaction. The total amount of such payments at any time before final completion shall not exceed ninety per centum (90 per cent) of the relative value of the work done, as estimated by the Engineer. Estimates of the relative value of the work performed will be made by the Engineer on or near the last day of the month in which the work was done, and payment therefor will be made on or before the 15th of the succeeding month. No monthly payment shall constitute an acceptance of any part of the work. The Contractor shall promptly make payments to all persons supplying labor and materials for the execution of the contract, and the Engineer may require satisfactory evidence to that effect before the payment of each monthly estimate.

No. 45. FINAL PAYMENT. Whenever the improvement provided for by the contract shall have been completely performed on the part of the Contractor, and all parts of the work have been approved by the Engineer, according to the contract, a final estimate showing the value of the work will be prepared by the Engineer as soon as the necessary measurements and computations can be made, all prior certificates or estimates upon which payments have been made being approximate only and subject to correction in the final payment. The amount of this estimate, less any sums that may have been deducted or retained under the provisions of the contract, will be paid to the Contractor within thirty (30) days after the final estimate is forwarded by the Engineer, provided that the Contractor has properly maintained the project as hereinafter specified, and provided for as furnished to the Commission a sworn affidavit to the effect that all bills are paid and no suits are pending.

These estimates referred to, illustrated on an adjoining page, originate with the engineer resident upon the work. He compiles them and submits them to the office of the district engineer where they are checked. The estimate is then forwarded to the Raleigh office, where it is again checked,

compared with the original contract for verification of authority and, after having any sums due the Commission deducted, it is approved and paid.

Prior to the payment of final estimates, the entire operation of the contract is recanvassed and all internal and external matter in any way bearing upon the contract or the estimate carefully examined. It is to be noted that the correctness of these final estimates is witnessed by five individual engineers, since these estimates are the sole justification for over 90 per cent of the funds expended by the Commission, the total of which may be seen in the report of the Auditor appearing elsewhere in this volume.

Federal Aid

The second of the duties mentioned consists in the drafting or examining of certain documents of record and agreement between the State and the Federal Government and collecting and maintaining a record of the funds appropriated by Congress for the purpose of aiding the building of roads by the State. The details of this function are more fully described below.

Upon being informed by the Secretary of Agriculture through the U. S. Bureau of Public Roads that certain funds have become available, under conditions described on page 29, this volume, and having determined the apportionment of the available funds among the nine districts of the State and the several roads therein, a document known as a "Project Statement" is compiled. The content of this document consists of both a familiar and technical description of the section of road under consideration, its termini, its general route, its length, its present and prospective traffic, its relation to the State's road system, its width and type of surfacing, and a reconnaissance estimate of its quantities and cost. This document is forwarded to the Secretary of Agriculture, and, when approved by him, authorizes, in principle, the construction of the road which it delineates.

Upon the approval of the Project Statement, plans are prepared describing and illustrating the proposed improvement in detail, giving dimensions, quantities, and lists of all appurtenances necessary for the complete, safe and continuous use of the road by the traveling public. These plans are forwarded to the Bureau of Public Roads at Washington, D. C., and are accompanied by a detailed statement of the total and final cost of the project. This statement is known as the Project Agreement Estimate and is the essential basis of all future negotiation.

Using the amount shown on the Project Agreement Estimate, the office of the Secretary of Agriculture prepares an agreement between the Federal Government and the State, stipulating the pro rata participation of the Federal Government, and the conditions, whose faithful performance by the State, will secure this participation. After this agreement has been executed the State is authorized by the Secretary to publicly advertise for bidders, to let the proposed work to the lowest responsible bidder, and to proceed with construction. Each month, after construction begins, a certificate of the cost of work done to date is submitted to the office of the Bureau of Public Roads, which office then authorizes the Treasurer of the United States to pay to the State, out of the funds appropriated by Congress, the Federal Government's pro rata share of the work done.

STATE OF NORTH CAROLINA
STATE HIGHWAY COMMISSION

District No. 1, SEPTEMBER 30 1922

Project No. 86 SEC. B. Length, Feet 4358 3 County MARTIN & BERTIE
Estimate No. 16 (FINAL) 3 Period from SEPTEMBER 1 1922 to SEPTEMBER 30 1922
Contractor BOYLE-ROBERTSON CONSTRUCTION CO. EVANS BLDG. WASHINGTON, D.C.
Contract Dated MARCH 9 1921 Working Days, Current 2 Previous 321 Total to Date 323 8
Completion % 100 Overrun to Date % 18.6 3 Contract Estimate \$ 248,937.23 ³⁰⁰ _{25 overrun}

Pro Rata Amounts Due From			Total Estimate to Date . . .	\$295,382.13
	%	Amount	Less 0 % Retained . . .	0
Federal Government		\$166,154.41	Balance (1) . . .	\$295,382.119
State			Less Previous Payments . . .	\$250,980.498
County		\$192,532.24	Balance (2) . . .	\$44,401.623
Total		\$358,686.65	Deductions . . .	0
			Amount Due This Estimate . . .	\$44,401.623

CERTIFICATE

I hereby certify that the quantities and amounts herein shown were compiled by me and are correct to the best of my knowledge and belief, and that the work has been performed and the materials used in accordance with the Plans and Specifications heretofore approved for same.

Red OCT 16 1922
To Grover OCT 16 1922
Red OCT 24 1922

A. K. Hayston
Resident Engineer

WILLIAMSTON, N.C.

Address

Recommended for Approval

Approved for Payment OCT 24 1922

[Signature]
District Engineer

[Signature]
Assistant to State Highway Engineer

Quantities Correct

[Signature]
State Highway Engineer

Senior Road Engineer

Paid by Voucher No. 16494

W. L. Craven 10/21/22 3
Senior Bridge Engineer

[Signature]
Auditor

Remarks:

OK Frank Ray
App. done & bond OK
3

10/25/22

Project No. 86 SEC. B.

SUMMARY

SEPTEMBER 30 1922

ITEMS	UNIT	QUANTITIES			Unit Price	Total Amount
		Previous	Current	Total		
Clearing	Acre	MATERIALS FURNISHED BY STATE				
Grubbing	Acre	CEMENT 7,875 BBLS @ 3.44				26,835.75
Excavation, Common	Cu. Yd.	STEEL REINFORCING 161,650 LBS. @ .0638				10,281.37
Excavation, Borrow	Cu. Yd.	" " 667,995 @ .0367				23,847.42
Excavation, Solid Rock	Cu. Yd.					20,964.54
Excavation	Cu. Yd.	WORK DONE BY STATE FORCES				
Overhaul of Excavation and Borrow	Sta. Yd.	CONCRETE CL. A 130 CU. YDS. @ 18.00				2,340.00
Base Course, Reconstructed	Ton					62,304.54
Base Course	Sq. Yd.					
Base Course						
Surface Course, Concrete	Sq. Yd.					
Surface Course—						
Surface Course—						
Surface Course— NAT. ROCK ASPHALT	Sq. Yds.	6779	54.5	6883.5	2.20	15,033.70
Overhaul on Surfacing	Sta. Yd.					
Concrete, A. SUPERSTRUCTURE	Cu. Yd.					
Concrete, A. BENT CAPS	Cu. Yd.	2521.5	0	2521.5	28.15	18,960.51
Concrete, A. PIVOT PIER	Cu. Yd.	822.8	1.57	824.37	23.00	70,980.28
Concrete, B. " "	Cu. Yd.	280.6	0	280.6	53.00	14,871.80
Concrete, B. " "	Cu. Yd.	132.1	0	132.1	53.00	7,001.30
Concrete, Masonry	Cu. Yd.					
Lumber, Crossed FENDER	M. B. M.	1238	0	1238	.50	619.00
Piling WOOD, UNTREATED	Lin. Ft.	49	0	49	192.00	9,408.00
Steel Reinforcing, PLACING, BENTS & SUPER	Lb.	657995	0	657995	.012	8,015.94
Steel Structural	Lb.	240021	0	240021	.12	29,402.52
Plates and Bolts	Lb.	32377	-565	31812	.08	2,544.96
Name Plates	Each	4	0	4	150.00	600.00
STEEL REINFORCING, PLACING, PILES	Lbs.	161650	0	161650	.034	5,657.78
" " " PIVOT PIER	"	7153	0	7153	.015	107.80
Headwalls, Concrete, Class	Cu. Yd.					
Headwalls, Masonry	Cu. Yd.					
Pipe, Inch	Lin. Ft.					
Pipe, Inch	Lin. Ft.					
Pipe, Inch	Lin. Ft.					
Pipe, Inch	Lin. Ft.					
Pipe, Inch	Lin. Ft.					
Pipe, Inch	Lin. Ft.					
PILES, CAST IN PLACE	"	27884.65	0	27884.65	1.95	54,375.07
" PRECAST	"	4414.75	0	4414.75	3.00	13,244.25
" FENDER, CREOSOTED	"	6400	0	6400	1.31	8,384.00
" TEST	Each	3	0	3	100.00	300.00
MACHINERY, SWING SPAN	Lbs.	33316.5	0	33316.5	.44	14,659.26
SAFETY GATES, " "	Each	2	0	2	350.00	700.00
HAND RAIL, " "	Lin. Ft.	448	0	448	2.50	1,120.00
LER. CREO. " "	M.B.M.	27.994	0	27.994	185.00	5,178.89
Contract Items					\$	281,164.52
Extra Work					\$	14,217.59
Total Estimate to Date					\$	295,382.11

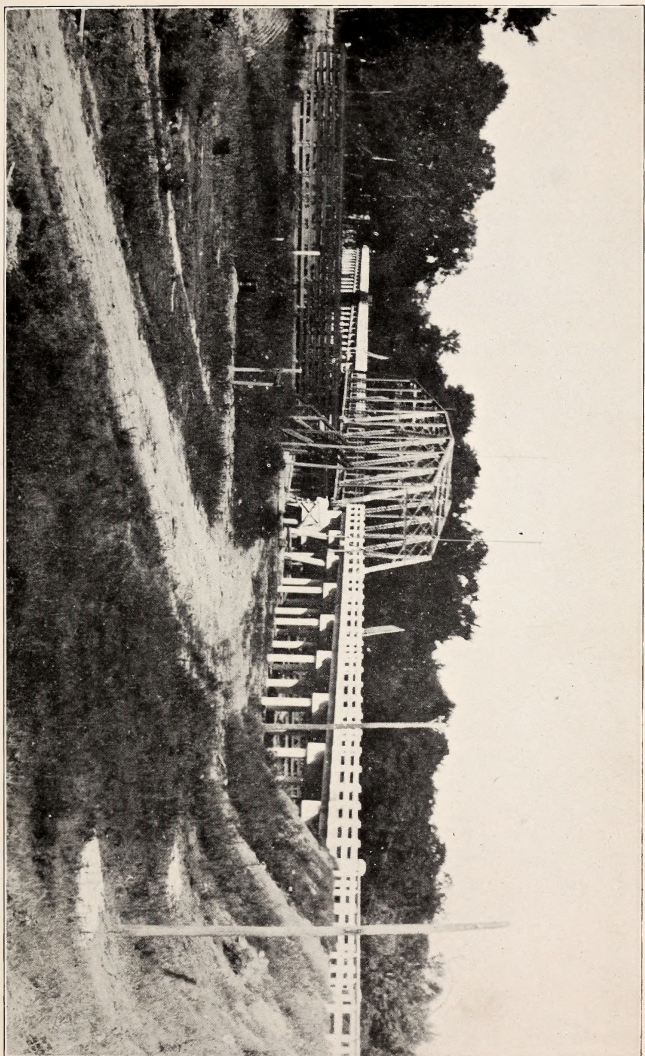
By orders No: (1-4), (1-15), (1-29) &

Such, in brief, is the procedure for obtaining Federal Aid. To June 30, 1922, the Federal Government had agreed to participate in the construction of 106 projects located in 72 counties. The following tabulation shows the summarized status of Federal Aid funds from June 30, 1916, to June 30, 1922, inclusive.

<i>Fiscal Years</i>	<i>Federal Aid Apportionments</i>	<i>Project Agreements Executed</i>	<i>Federal Aid Paid to State</i>
1917	\$ 114,382	\$ 23,196	
1918	228,764	112,500	\$ 22,154
1919	1,482,534	345,256	41,571
1920	2,165,957	2,127,117	224,517
1921	2,279,054	3,132,190	2,755,576
1922	1,709,334	394,413	2,264,343
Totals:	<u>\$7,980,025</u>	<u>\$6,134,672</u>	<u>\$5,308,161</u>

PART III

District Reports of Construction and Maintenance



WILLIAMSTON BRIDGE—FEDERAL AID PROJECT NO. 86-B—MARTIN-BERTIE COUNTIES

District Reports of Construction and Maintenance

FIRST DISTRICT

CONSTRUCTION

This district is composed of the following counties: Beaufort, Bertie, Camden, Chowan, Currituck, Dare, Edgecombe, Gates, Halifax, Hertford, Hyde, Martin, Nash, Northampton, Pasquotank, Perquimans, Pitt, Tyrell and Washington. The district is in charge of J. C. Gardner, district engineer, with headquarters at Tarboro. Construction is in charge of A. Snyder, construction engineer, while maintenance is in charge of L. B. McDaniel, maintenance engineer.

Beaufort

The only road under construction in this county at present is Project No. 100, located on route No. 30, between Washington and the Martin County line, 10.58 miles in length. The pavement is of reinforced concrete, 18 feet wide on a 30-foot roadbed, and will cost approximately \$370,000.

Bertie

Construction in Bertie County consists of Federal Aid 86-A and B. Project 86-A, consisting of a 30-foot roadway with sand-clay surfacing on an embankment through the Roanoke River Swamp between Williamston and Windsor, while Project 86-B is a drawbridge across Roanoke River at Williamston.

Camden

The contract has been let for Project 174, consisting of 2.4 miles of roadway between Newland Church and South Mills, the greater part of this project being in Camden County. The road is being built as a corduroy road and will cost approximately \$56,000.

Chowan

Construction in this county consists of grading 20.32 miles on route No. 32 from Edenton towards Gates County line. The contract has been awarded for the work, which will cost approximately \$85,000, and the work is about 50 per cent complete as of June 30.

Currituck

No construction is under way in this county at the present time.

Dare

No construction is under way in this county at the present time.

Edgecombe

At the present time there is only one project under construction in this county, this being Project No. 125, which is located between Rocky Mount and Tarboro, a distance of 15.1 miles on route No. 90. This project will be of the asphaltic-concrete type, the surfacing being 16 feet, laid on a

30-foot graded roadway. The entire project will cost approximately \$386,000 and at the present time is 22 per cent complete.

Gates

No construction is under way in this county at present.

Halifax

There are at the present time four projects under construction in this county, namely, Project No. 137 consisting of 5.8 miles of penetration macadam road on route No. 40, between Weldon and Roanoke Rapids, which is being constructed at a cost of \$140,000 and which at the present time is approximately 33 per cent complete; Project No. 138-A, 14 miles of gravel and sand-clay roadway on route No. 13, between Scotland Neck and Rich Square. Only six miles of this project, however, lies in Halifax County, the remainder being in Northampton County. This project will cost approximately \$120,000, and at the present time is 18 per cent complete. Plans are being made for a bridge over the Roanoke River which will unite the Halifax and Northampton sections of this project; Project No. 139, which consists of a concrete bridge and one-half mile of embankment at Fishing Creek on route No. 40. The bridge, which is about 93 per cent complete, consists of three 35-foot spans of reinforced concrete and will cost in the neighborhood of \$16,000; Project No. 140 which consists of two concrete bridges on route No. 12 near Scotland Neck and which will cost approximately \$10,000, the work at the present time being 50 per cent complete.

Hertford

The contract has been let for the construction of Project No. 145 consisting of 12.9 miles of roadway from the Northampton County line to Winton and construction will begin at an early date. At the present time the road will only be graded but will be surfaced at some later date. This county has recently passed a \$500,000 bond issue and is engaged in building satisfactory lateral roads which will connect with the State Highway System.

Hyde

Construction in Hyde County consists of grading Project No. 151, 4.3 miles of road from Swan Quarter to Rose Bay Fork, which is about 50 per cent complete and will cost approximately \$47,000.

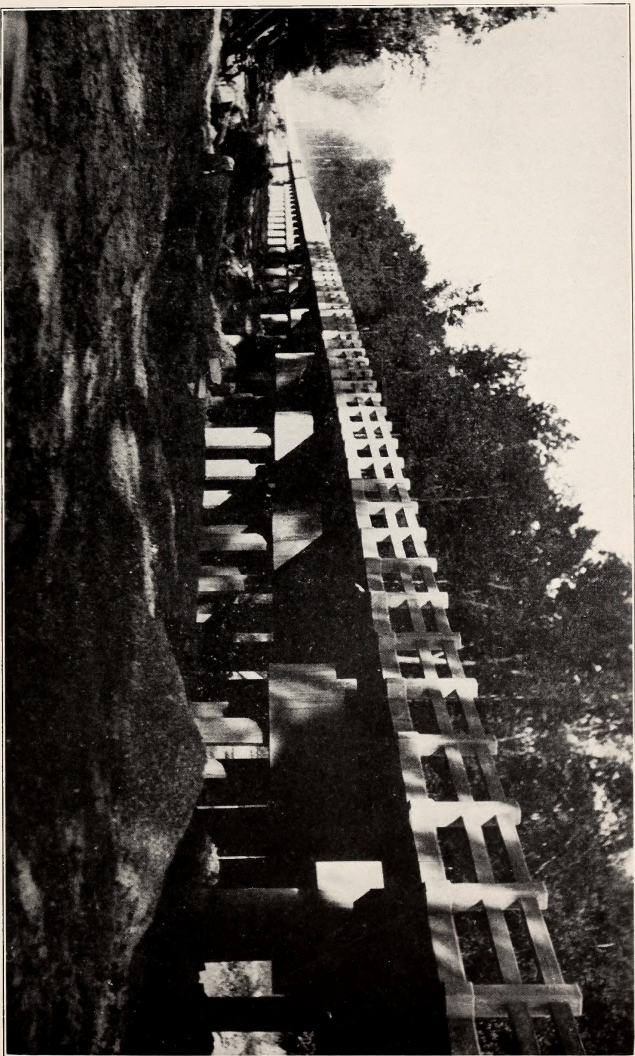
Martin

There are two projects under construction in this county as follows: Project No. 154 from Williamston to the Beaufort County Line on route No. 30. This project is of asphaltic-concrete construction on a plain concrete base, 11.3 miles in length, and will cost approximately \$358,000.

Project No. 155, extending from Bethel, Pitt County, to Williamston, Martin County, on route No. 90, is being constructed of sand-clay surfacing and will cost approximately \$90,000, 38 per cent of which has been expended.

Nash

Construction in Nash County consists of three projects, two of which are being constructed under the present administration from State funds, the third of which was begun under the preceding administration and was built from Federal Aid, State and county funds. The first two projects form



VIADUCT APPROACH TO WILLAMSTON BRIDGE—BERTIE COUNTY

an important link in the highway leading from Raleigh to the eastern section of the State.

Project No. 159 begins at Nashville, the county seat and extends 11.22 miles to Tar River west of Spring Hope. This project, which is 32 per cent complete, will cost in round figures \$82,000, which cost includes a bridge over the Tar River consisting of eight 35-foot reinforced concrete spans and one steel span across the channel proper.

Project No. 160 extends from Tar River, 9.86 miles across a corner of Franklin County and one-half mile into Wake County, only 3.9 miles of this project being in Nash County. This latter project will cost approximately \$49,000 and at the present time is 68 per cent complete.

Federal Aid Project No. 73 is located on route No. 40, between Rocky Mount and Whitakers, a distance of 8.73 miles. The road is surfaced with top soil and sand-clay and has been completed at a most of approximately \$143,000.

Northampton

In addition to the portion of Project No. 138-A, already described in the Halifax County report, construction in Northampton County consists of the following: Project No. 166, two concrete bridges in Urahaw Swamp and about .54 of a mile of roadway on an embankment on route No. 305. Construction is approximately 54 per cent complete on this project and will cost in round figures \$16,500.

Contract has also been awarded for Project No. 167, beginning at the end of old Federal Aid Project 48-A, described in the preceding report, and extending through Jackson to the Hertford County line near Murfreesboro, 20.9 miles. This road will be surfaced with top soil and, including structures, will cost approximately \$84,000.

Federal Aid Project 48-B, extending from the Roanoke River Bridge near Weldon, 2.9 miles towards Jackson, was completed in the fall of 1921, at a cost of \$42,680.

Pasquotank

Construction in Pasquotank County consists of the construction of about one-third of a mile on Project No. 174, previously noted in the Camden County report.

Project No. 175 consists of 12 miles of monolithic brick pavement nine feet in width, beginning at Elizabeth City and ending at Newland Church. The project, which is about 90 per cent complete, will cost approximately \$200,000. This road was begun by the Pasquotank Highway Commission prior to the reorganization of the State Highway Commission but was taken over soon after the present commission was reorganized.

Perquimans

There has been no construction in this county under the supervision of the State Highway Commission.

Pitt

There are three projects under construction in this county. Project No. 183-B consists of structures only on the road between Greenville and Bethel, the cost of this work being approximately \$29,000.

Project No. 185 consists of the grading and drainage of 14.35 miles between Greenville and the Beaufort County line on route No. 91. Approximately 34 per cent of the work has been completed.

Project 186 consists of 9.64 miles of 16-foot reinforced concrete pavement from Greenville to Ayden. The contract for this work only covers the surfacing as the work on grading and structures was done under the preceding commission as Federal Aid Project No. 65. The work, which will cost \$237,000, is practically complete.

Tyrrell

Construction in Tyrrell County consists of Project No. 191, beginning at the Washington County line and following route No. 90 to the Scuppernon River at Columbia, a distance of 6.53 miles. Approximately \$54,000 will be expended in the grading, drainage and surfacing with sand-clay of this project.

Washington

Construction in the above county consists of Project No. 195, beginning at the Martin County line west of Plymouth and extending 15.18 miles on route No. 90 to Pleasant Grove Church. The work will cost approximately \$60,000, which includes the grading, drainage and sand-clay surfacing.

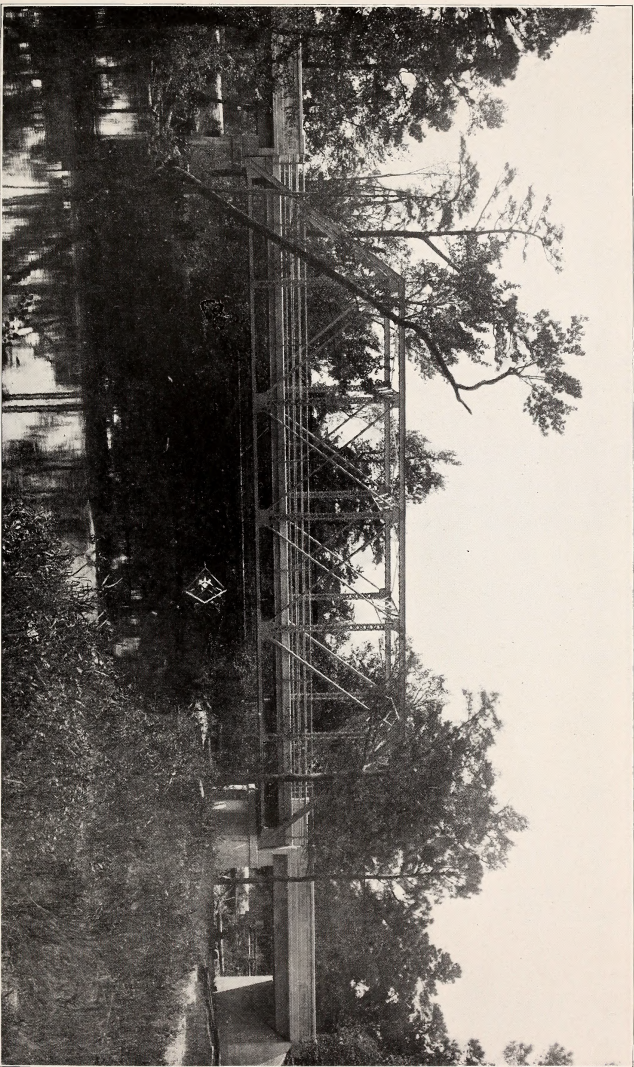
Project No. 196 begins at Pleasant Grove Church and follows route No. 90, 14.93 miles to the Tyrrell County line. This project is identical in construction with Project No. 195, and will cost \$76,000.

MAINTENANCE

The roads under maintenance in the First District aggregate a total of seven hundred and fifty-one miles divided as follows: Hard-surface fourteen miles, dirt road five hundred and ninety-two miles, unimproved road sixty-four miles, gravel road thirty-eight miles, and top-soil road eight miles.

All of the hard-surface road in the First District has been carefully patched where necessary, the shoulders built up and detrimental shade cut back. The dirt roads, which constitute the largest mileage in the district, are the roads which had been graded prior to the time they were taken over by the State Highway Commission Patrol Forces. These roads have been dragged whenever necessary and where deemed advisable have been reconstructed. Similar treatment has been given the gravel and top soil roads and in addition, where necessary, new surfacing material has been placed. A majority of the mileage of unimproved road is located in the extreme eastern section of the State and very little could be done except for dragging and rebuilding of the drainage structures.

In a general way the maintenance consisted of rebuilding wooden bridges throughout the district, placing new drain pipe, placing danger signals, guide signs, and in white-washing guard rails and all bridges. Maintenance work was somewhat hindered when first taken over by the Highway Commission forces on account of the inability to secure motor equipment, as most of the trucks when turned over to the Highway Commission by the counties to which they had been rented, were in such condition as to render operation impossible, and real maintenance work did not begin until about the first of October, 1921. Since that time, however, a great deal of progress has been made towards keeping the roads, throughout the district passable the year round.



BRIDGE OVER LUMBER RIVER ON PROJECT NO. 388—ROHESON COUNTY

SECOND DISTRICT

CONSTRUCTION

The Second District is composed of the following counties: Carteret, Craven, Duplin, Greene, Johnston, Jones, Lenoir, Pamlico, Sampson, Wayne and Wilson. This District is in charge of R. E. Snowden, District Engineer, with headquarters in Kinston. Construction is in charge of R. E. Swinney, Construction Engineer, while maintenance is in charge of R. Markham, Maintenance Engineer.

Carteret

Contract has been let for 13.68 miles of graded road between Morehead City and Craven County line. The work, which is known as Project No. 200, will cost approximately \$79,000.

Craven

In this county there are two State Projects under construction, one project completed and one Federal Aid Project under construction. Project No. 209 consists of 2.65 miles on route No. 302 from Bridgeton to the Pamlico County line and was completed on February 15, 1922, at a cost of \$116,000, this figure including the grading, drainage and plain concrete surfacing.

Project No. 210, consisting of 8.34 miles of road from Lenoir County line to Fort Barnwell, is being constructed of asphaltic-concrete on a cement concrete base and will cost approximately \$293,000.

Project No. 211 consists of 9.93 miles from Trent River Bridge near New Bern to Croatan. This project is similar in construction with Project No. 210 and will cost in round figures \$290,000.

Federal Aid Project No. 4 was begun under the former Highway Commission and consists of the grading and surfacing with top soil and sand clay of 9.46 miles on route No. 10 from East Creek to the Carteret County line.

Duplin

Construction in the above county consists of State Projects No. 218 and No. 219 and Federal Aid Project No. 103.

Project No. 218 consists of the grading of 16.1 miles of road on route 40 from Mount Olive to Warsaw at a cost of \$92,000.

Project No. 219 includes the grading and drainage of 15.6 miles of road on route No. 11 from Pink Hill to Kenansville. This work will cost approximately \$148,000.

Federal Aid Project No. 103 consists of grading, draining and surfacing with sand clay of 11.32 miles from Sampson County line to Kenansville via Warsaw. This project was completed October 10, 1921, at a cost of \$112,000, 50 per cent of which was paid from Federal Aid funds, the remainder from State and county funds.

Greene

There is only one project under construction in this county at this time, this being Project No. 227, consisting of 6.8 miles on route No. 12 from the Lenoir County line to Snow Hill. Asphaltic concrete is being used as surfacing on this road and the work will cost in round figures \$240,000.

Johnston

Construction was completed on Federal Aid Project No. 58 on May 20, 1922. This project, which consists of 6.02 miles through Banner Township between Smithfield and the Harnett County line, was begun under the former administration and cost approximately \$69,000, this figure covering the grading, drainage and surfacing with sand-clay.

Contract has been let for the construction of State Project No. 236, consisting of 14.83 miles on route 10 from the Wake County line to a point near Smithfield. The standard asphaltic-concrete pavement on a plain concrete base will be laid on this project and the total construction will cost approximately \$475,000, a portion of which will be paid from Federal Aid funds under the Act of November 9, 1921, inasmuch as this project is included in the State primary system and is designated as one of the projects to receive Federal Aid.

Jones

Only one project is under construction in this county, this being Project No. 245, 15.76 miles of surfaced treated macadam on route No. 30 and No. 303 from the Craven County line to Trenton. This project will cost in round figures \$265,000.

Lenoir

There are four Federal Aid Projects in this county all of which were begun under the preceding administration under the Federal Aid Act of 1916. These projects are all a part of route 10 through this county and form a complete hard surface highway from the eastern to the western boundary of the county. Federal Aid Project No. 11 extends from the western boundary of the town of Kinston 1.78 miles to Hines Junction. The road is of sheet asphalt construction and was completed January, 1921. Federal Aid Project No. 49 extends from the end of Federal Aid No. 11, 6.02 miles towards Goldsboro to the beginning of Federal Aid Project No. 53. This project is likewise of sheet asphalt construction and was completed in June, 1921. Federal Aid Project No. 53 extends from the end of Federal Aid No. 49, 7.23 miles to the Wayne County line. Construction work on this project was completed in February 1921. Federal Aid Project No. 60 extends from the eastern boundary of Kinston 7.88 miles on route No. 10 to the Craven County line. The surfacing on this project is identical with that on the three above mentioned projects and work was completed in April of the current year. The total cost of construction of these projects was in round figures \$611,300, of which \$200,000 was paid from Federal Aid funds.

Lenoir County has one of the most complete hard surface road systems of any county in the State as there is a network of hard surface roads extending in every direction from Kinston, the county seat. A large part of this system was built by the County Commission at no cost to the State Highway Commission.

Pamlico

There are two State Projects under construction and one Federal Aid Project completed in this county. Federal Aid Project No. 90, which was completed in September, 1921, consisted of the grading of 12.03 miles on route



SAND ASPHALT ROAD—PROJECT NO. 379—PENDER COUNTY

No. 302 from the Craven County line to Bayboro. The hard surfacing of this project is covered by State Project No. 263, which is now under construction. A surfacing of asphaltic-concrete on a cement concrete base is being laid at a cost of approximately \$289,000.

Project No. 264 consists of a bridge and a fill across Broad Creek on route No. 202, the total cost of construction being approximately \$26,500.

Sampson

Project No. 272 consists of the grading and draining of 16.47 miles on route No. 60 from Delway to the Pender County line, the construction of which will cost in round figures \$99,000.

Federal Aid Project No. 68, which was completed on June 24, 1922, consisted of 27.4 miles of sand-clay road from Clinton to Dunn on route No. 60. The cost of construction of this project was approximately \$305,000. A portion of this work is located in Harnett County.

Wayne

Construction has been completed on three Federal Aid Projects in this county, namely, Projects No. 12, No. 13 and No. 34 and construction is under way on two State projects.

Federal Aid Project No. 12 extends from the city limits of Goldsboro 8.62 miles to the Johnston County line on route No. 10. Work of grading and surfacing the road with sand-clay was completed November 2, 1920, at a cost of \$27,000.

12.57 miles of sand-clay road, comprising Federal Aid Project No. 13, was completed November, 1921, at a cost of \$101,500. This project extends from the city limits of Goldsboro southward to Mount Olive on route No. 40.

Federal Aid Project No. 34 is a bridge over Neuse River, on route No. 40, and was completed in October, 1921, at a cost of \$50,798. This bridge is of reinforced concrete and steel construction and replaces an old covered wooden bridge which had become unsafe for traffic.

Construction was begun in November, 1921, on State Project No. 280, 10 miles of hard surface road on route No. 10 between the city limits of Goldsboro and the Lenoir County line. Standard asphaltic-concrete on a cement base is being laid and cost of construction is estimated to be \$311,000.

Project No. 281, consisting of four bridges on Federal Aid No. 13, mentioned above, is also under construction. These bridges will cost in round figures \$22,500.

Wilson

Construction was completed in March of the current year on Federal Aid Project No. 117. This project consisted of 6.25 miles of sand-clay road extending from the town of Wilson northward to the Nash County line. The cost of construction of this road was approximately \$42,000, one-half of which will be paid from Federal Aid funds.

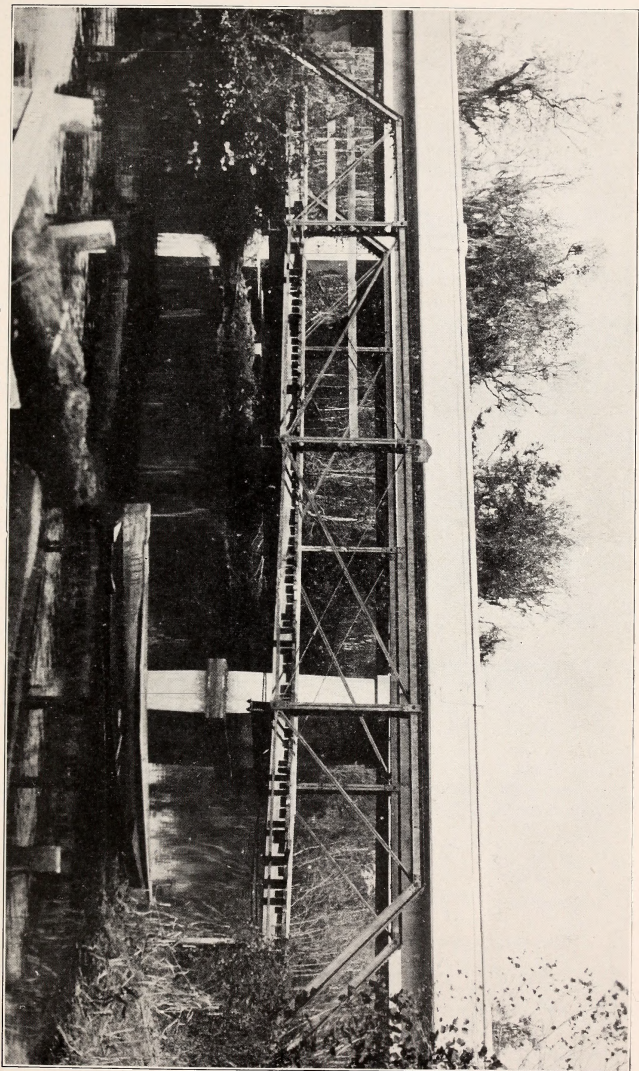
Federal Aid Project No. 127 extends from Contentnea Creek 7.63 miles to the Wayne County line. This project was graded and is now being surfaced as State Project No. 291, an asphaltic-concrete surfacing laid on a cement base is being constructed at an estimated cost of \$203,500. Construction was begun in January, 1922.

MAINTENANCE

Roads maintained in this District by State Highway Commission Forces are of the following types; one hundred and one miles of hard surface road, graded road thirty-three and four-tenths miles, sand-clay and top-soil three hundred and thirty-seven and eight-tenth miles, surface treated macadam twenty-one and one-tenth miles, unimproved road one hundred and forty-four and eight-tenths miles and shell road two and one-half miles making a total of 640.6 miles. Eleven and six tenths miles of this amount is not located in the Second District, but is maintained by patrol forces of this district, inasmuch as the section of road can be more easily reached by these forces than by those of the district in which it is located.

In the case of hard surface roads the shoulders have been built up throughout the entire mileage, shade cut back, and where necessary, drainage structures have been cleaned out. When the roads were first taken over by the State an extensive maintenance program was carried out in this district with a view to bringing all of the roads up to as high a standard as possible in a short time. Since this time the roads have been given constant attention by patrol forces and the earth and graded roads have been dragged at all times when necessary. Since this district is located in the eastern part of the State a large amount of ditching was necessary in order that the roads might be properly drained. These ditches have been cut and all wooden bridges rebuilt and whitewashed.

In some instances the earth roads were very narrow and where this was the case the roads have been widened out as much as possible and have been brought to the proper crown. The mileage of surfaced treated macadam has been resurfaced wherever the original surfacing had worn out.



OLD AND NEW BRIDGE OVER LONG CREEK—PENDER COUNTY

THIRD DISTRICT

CONSTRUCTION

This district is composed of the following counties: Bladen, Brunswick, Columbus, Cumberland, New Hanover, Onslow, Pender and Robeson. The Third District is in charge of W. F. Morson, District Engineer, with headquarters at Wilmington. Construction is in charge of Daniel Ulrich, Construction Engineer, while T. T. Betts, Maintenance Engineer, is in charge of maintenance work.

Bladen

One Federal Aid Project has been completed during the period covered by this report and construction begun on three State projects. Federal Aid Project No. 120 which is located between Elizabethtown and the Cumberland County line, a distance of 23.67 miles. This road is of the sand-clay type and was constructed at a cost of \$105,688. Construction was completed in June, 1922.

State Project No. 300, which is located between Elizabethtown and Columbus County line, a distance of 11.99 miles, has been under construction since April 8, 1922. This road will be of the sand-clay type and will cost in round figures \$57,000.

State Project No. 301, between Clarkton and the Robeson County line, is being constructed as a sand-clay roadway at the present time. The structures have all been completed and it is expected that the roadway will be open for traffic by January, 1923. Approximately \$82,000 will be expended in the construction of this project.

Brunswick

Construction is well under way on Federal Aid Project No. 61-A and B. These projects form one of the most interesting pieces of work yet undertaken by the Commission. The former consists of building a road 2.31 miles long over the old Brunswick Causeway through Eagle Island, the cost of construction of which is estimated at \$140,000. Federal Aid Project No. 61-B consists of four structures on the roadway which makes up Project No. 61-A. The largest of these bridges is one consisting of three 140-foot steel spans across the Brunswick River; all of the bridges have been completed except the last mentioned. Approximately \$150,000 will be expended in the construction of Project 61-B.

Project No. 312 includes the construction of a plain concrete roadway from Leland to the Columbus County line, a distance of 9.77 miles, at a cost of \$347,000. This project is located on route No. 20 and forms a link in the Wilmington-Charlotte-Asheville Highway. All structures have been completed and the work on the roadway is progressing satisfactorily.

Project No. 313, consisting of 3.44 miles of Willite pavement, has been under construction since March, 1922, and should be completed before the close of the current year. This work extends from the junction of the Southport road to Leland and will cost in round figures \$96,097.

Project No. 314 is located between Southport and Supply, is 15.82 miles in length, of the sand-clay type, and will cost approximately \$99,325. Construction should be completed before the Spring of 1923.

Construction is under way on Project No. 316, located between Brunswick Station and a junction point on the Wilmington-Charlotte-Asheville Highway, a distance of 12.12 miles. This road will be of the sand-clay type and will cost approximately \$73,000. At the present rate of progress the work should be completed in the late Spring of 1923.

Columbus

On May 10, 1920, contract was executed for the construction of 11.7 miles of road between Lumber River and Chadbourn. This project, Federal Aid No. 59-A, was completed at a cost of \$107,000 and since completion has been under maintenance.

Federal Aid Project No. 75 is located between Chadbourn and Whiteville on route No. 20, has also been completed and is under maintenance. This project is of the sand-clay type, 7.03 miles long and cost \$67,000.

Project No. 325 consisting of 11.22 miles of roadway on route No. 20, between Whiteville and Lake Waccamaw, was placed under construction in November, 1921, and at the present rate of progress should be completed and open to traffic by January, 1923. This project is also of the sand-clay type and will cost approximately \$105,258.

Contract has been awarded for the construction of a sand-clay road, Project No. 326, extending from Lake Waccamaw to Freeman, 13.61 miles, approximate cost of construction being \$195,840.

Contract has been executed for the construction of Project No. 327, a distance of 5.2 miles of sand-clay road from Freeman to the Columbus County line, this project completing a link of route No. 20 in Columbus County.

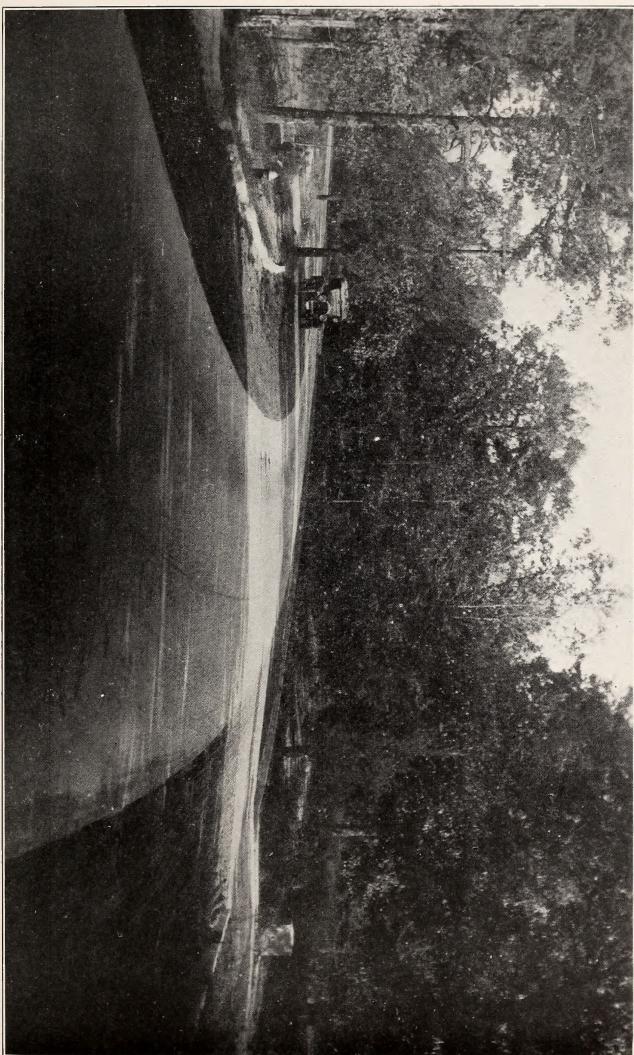
Cumberland

Construction has been completed on Federal Aid Project No. 8, which extends from Fayetteville to the Sampson County line, a distance of 13.46 miles. The finished roadway is gravel surfacing and cost approximately \$57,558, a portion of which has been paid from Federal Aid funds.

In addition to the above Federal Aid Projects there are three State Projects under construction in this county. The first of these projects, No. 338, consists of the construction of a bridge over South River at Autryville. This contract has been completed at a cost of \$23,931 and the bridge has been opened to traffic.

Project No. 339 is located in Cumberland and Harnett Counties and consists of building a bridge over Little River which marks the boundary line of these counties, and a sand-clay road for a distance of .75 of a mile, costing approximately \$15,000. This project has also been completed and is open to traffic.

The only hard surface project under construction in this county is Project No. 340 which extends from Fayetteville to the Hoke County line. 11.7 miles of roadway will be of plain concrete and, with the structures, will cost in round figures \$381,000. All structures on this project have been completed and good progress is being made with the roadway.



DURHAM—CHAPEL HILL BOULEVARD

Project No. 341 consists of grading an approach in making connection between Project No. 340 and Federal Aid No. 105, Hoke County. This work was done at a cost of \$923 and has been completed.

New Hanover

With the exception of a portion of Federal Aid Project No. 61-A, there is no construction under way at the present time in this county.

Onslow

There are two projects under construction in this county, namely, Project No. 364-A, contract for which was executed in February of the current year and which covers the construction of graded roadway from the Pender County line to Dixon on route No. 30. The approximate cost of construction being \$40,575. It is intended to surface this project at an early date with sand asphalt.

Project No. 364-B covers the roadway from Dixon to Jacksonville, a distance of 12.84 miles, the grading of which, with the structures, will cost approximately \$91,000.

Pender

There are five projects under construction in this county at this time.

Project No. 375 consists of grading and draining 15.56 miles of road on route No. 30 from Scotts Hill to the Onslow County Line. The grading for this project was extended into New Hanover County .53 of a mile in order to abandon two grade crossings over a railroad and this additional cost was included in the approximate cost of this project, which was, in round figures, \$66,000. This project is at the present time being surfaced with sand-asphalt by State Highway Commission force.

Project No. 376 consists of the construction of a number of structures and approaches to same on route No. 60. The roadway on which these bridges are located was built by county authorities and has been completed for some time. The cost of construction of these structures and the approaches will approximate \$95,000. The work should be completed by January, 1923.

Project No. 377 covers the grading and draining of 1.61 miles of road at the Rock Fish Creek, which is the Pender-Duplin County line. The cost of construction of this work will be in round figures \$76,985.70.

Project No. 378 covers the hard surfacing of a portion of Federal Aid Project No. 81. This section of the road extends from Castle Hayne Bridge to Burgaw, 14.12 miles, and is to be a macadam road, constructed of local limestone road and at a later date will be surface treated by State forces. The cost of paving this project will be approximately \$194,000.

Robeson

There are only two projects under construction in this county. On November 1, 1921, contract was executed for Project No. 388, covering the construction of a reinforced concrete roadway 18 feet in width for a distance of 3.35 miles from Lumberton to the Junction of the Red Springs road, the approximate cost of construction being \$106,046.

On December 2, 1921, contract was executed for building a bridge across Lumber River about three miles west of Lumberton and located within the limits of the above project. This bridge has been completed at a cost of \$18,507 and photograph of same appears elsewhere in this report.

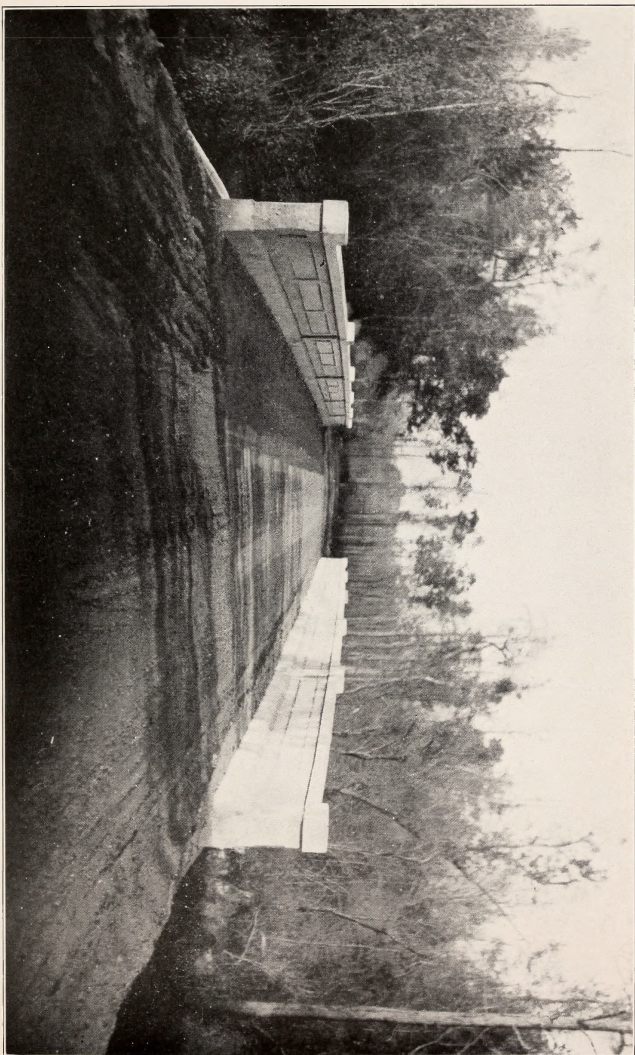
Project No. 389 consists of the construction of a sand-clay roadway and bridges at the Robeson-Columbus County lines, this including a bridge over Lumber River. The roadway of this project has been completed, as have all structures excepting the bridge over Lumber River, the cost of construction, in round figures, being \$75,880.

MAINTENANCE

There are 601.5 miles of the State Highway System under maintenance in the Third District at the present time. This mileage is divided according to types as follows: sand-clay and top-soil 230.1 miles, dirt road 258.4 miles, gravel road 54.7 miles, surface treated macadam 23.4 miles and unimproved road 24.9 miles.

As will be seen by these figures a large amount of the mileage in this district is made up of sand-clay. These roads have been given careful attention by the patrol forces and have been worked up into excellent condition, new surfacing having been applied where necessary. The dirt roads throughout the district have been worked over by forces using a large road machine and tractor and are in very good condition, having been resurfaced with sand-clay in a number of instances.

All of the surface treated macadam in this district is located in New Hanover County, and be it said to the credit of the county officials, these roads have been kept in excellent condition. Since these roads have been taken over by the State the maintenance work has consisted of patching, where necessary treating with a new coat of tarvia, cutting back brush, and in keeping ditches open on all of the roads that are under maintenance. The wooden bridges have been rebuilt and are in first-class condition. In addition to the above mentioned maintenance work forces have been engaged in placing on telephone poles and other prominent objects on the road, the standard route marker, and in placing at dangerous curves, narrow bridges, etc., the danger signs.



PROJECT NO. 436—HARNETT COUNTY—GRAVEL ROAD

FOURTH DISTRICT CONSTRUCTION

The Fourth District is composed of the following counties: Chatham, Durham, Franklin, Granville, Harnett, Lee, Orange, Person, Vance, Wake, and Warren. The district is in charge of F. E. Schnepfe, district engineer, with headquarters in Durham. The construction work in this district is in charge of R. Getty Browning, construction engineer, while maintenance work is in charge of W. D. Somervell, maintenance engineer.

Chatham

Federal Aid Project No. 99-A, located between Orange County line and Pittsboro on route No. 75, a distance of 12.64 miles, has recently been completed at a cost of \$90,665. This road is of the top-soil type with reinforced concrete structures. The cost of construction does not include the bridge and approaches over Haw River at Bynum, which is covered by a separate project.

Federal Aid Project 99-B, extends from Pittsboro west on route No. 75, through Siler City to the Randolph County Line, a distance of 21.82 miles. It is also of top-soil construction with reinforced concrete structures and the work, which is practically complete, will cost approximately \$236,400. A portion of the cost of construction of both of the above projects will be paid from Federal Aid funds.

In addition to the above Federal Aid Projects, construction is under way for two State Projects in this county. The first of these, Project No. 400, consists of a reinforced concrete deck girder bridge, consisting of nineteen 40-foot spans, located over Haw River at Bynum, on route No. 75, and will replace one of the few remaining covered wooden bridges in this State. An interesting fact in connection with the old wooden bridge is that when it was built some forty-five years past, the contract price, according to records, was \$4,444.44, this covering the entire cost of constructing the 800-foot bridge. The new bridge will cost in round figures \$52,000, and should be completed in the Spring of 1923.

Project No. 402 is located on route No. 60, between Siler City and the Randolph County Line, a distance of 6.7 miles. The construction of this road on the new location eliminates four dangerous grade crossings, secures a shorter route from Siler City to Greensboro, and opens a direct route from Greensboro to Sanford, Southern Pines and Pinehurst. Construction consists of a 30-foot graded roadway, top-soil surfacing 16-feet in width, and concrete drainage structures, the total cost of construction being estimated at \$30,860.

Durham

One of the most important projects in this county which was built during the period covered by this report is Federal Aid Project No. 71, which constitutes the Durham County section of the University Boulevard, connecting Durham and Chapel Hill. On account of the fact that no satis-

factory bids were received for the construction of this project the work was done by State forces, the cost of construction being paid partly from Federal Aid funds, from a contribution from Durham County of \$120,000 and the balance from State funds. The improvement consists of 4.92 miles of Kentucky Rock Asphalt laid on a broken stone base course and 1.78 miles of the same surfacing laid on a concrete base course.

State Project No. 409 covers the grading of Morehead Avenue in the city of Durham connecting the hard surface pavement on the Chapel Hill road with Vickers Avenue, thus completing the University Boulevard into Durham. Work on this project is practically complete. The estimated cost for the grading of the .48 of a mile is \$5,580. Pavement will be laid on this project by county authorities.

Project No. 410 is an important part of the Central Highway, or route No. 10, and is located between Durham and Hillsboro beginning at the end of the asphalt pavement west of Durham and extending 2.3 miles towards the above mentioned town. The major portion of this project has been relocated in order that two dangerous grade crossings may be avoided. The road will be surfaced with reinforced concrete 18 feet in width and will cost in round figures \$76,300. Construction was begun in April of the current year and should be completed in the early fall.

Project No. 411 begins at the end of the present concrete pavement five miles east of Durham and extends to the Wake County Line near Clegg, connecting at this point with Project 481, Wake County. The project forms a very important link in route No. 10 and in addition is of great importance locally since it connects two of the most important cities of the State. The project is 5.3 miles in length and will be surfaced with a plain concrete pavement 18 feet wide. Construction was begun in September, 1921, and should be completed by October 1, of the current year. Including the relocation which was made to eliminate the single grade crossing on the project, the estimated cost is \$192,340. This road replaces an old waterbound macadam road which had become so worn as to be almost impassable.

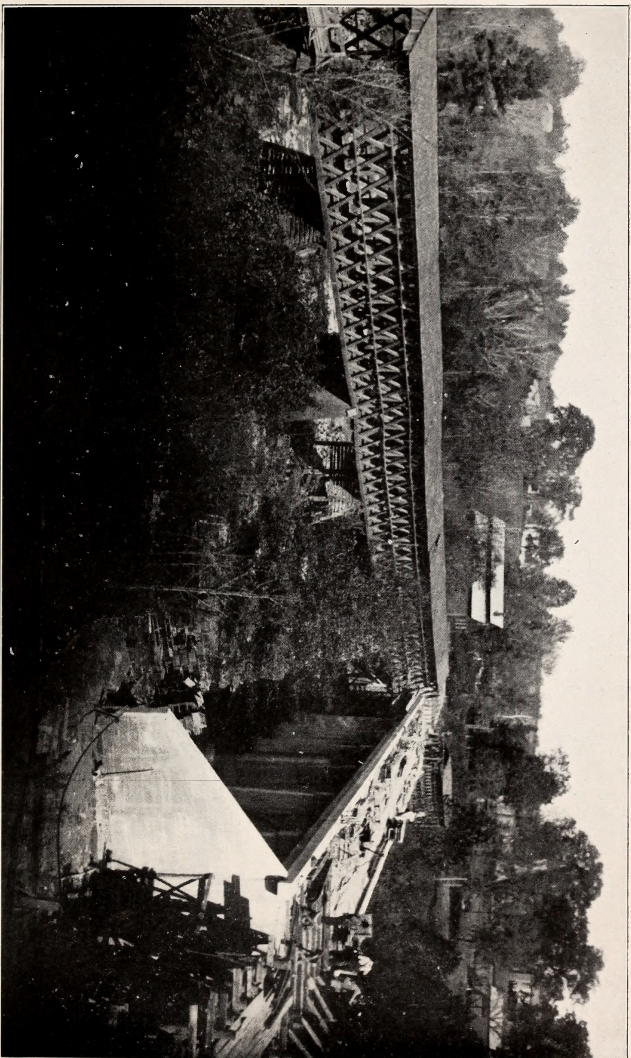
Franklin

Federal Aid Project No. 93 consists of the grading and surfacing with top soil of 19.80 miles of road beginning at a point four miles south of Warrenton in Warren County and ending at the Franklin-Nash County lines near Castalia. This project has been completed at a cost of \$198,402.

Mention has been made under the report for Nash County of Project No. 160, a portion of which is located in Franklin County.

Project No. 419 consists of the grading and surfacing with top soil of 13.8 miles of road extending from a point one mile east of Louisburg to the Nash County Line, following route No. 56. By several relocations a number of steep grades and dangerous curves have been avoided and a considerable saving in distance effected. This project will cost approximately \$55,528.

Project No. 420-A and B, consists of grading and paving with plain concrete 1.55 miles of road beginning one mile west of Louisburg and extending through the town toward the Nash County line. The pavement as



STATE PROJECT No. 400—CHATHAM COUNTY—OLD AND NEW BRIDGES

built by the State is 18 feet in width but an additional 12 feet is being added in the business section by the town of Louisburg. The estimated cost of the construction which will be borne by the State is \$50,500.

Granville

Project No. 427 consists of 5.12 miles of road between Oxford and Lewis, on route No. 75. This road is being surfaced with asphaltic-concrete laid on a cement concrete base, the surfacing being 18 feet in width. This project, which forms a part of the highway from Richmond South, through Durham, will be completed during 1922, at an approximate cost of \$162,000.

Contract has been awarded for the construction of Project No. 428, 4.3 miles of reinforced concrete roadway from the end of the above mentioned project at Lewis, north to Stovall, the estimated cost of construction being \$129,680.

Harnett

An important link of the Raleigh-Fayetteville road, which is also a part of the Lafayette Highway, is under construction in the above county. This Project, No. 436, consists of 21.91 miles of gravel road extending across Harnett County from the Wake County Line to the Cumberland County Line through Lillington. Excellent progress is being made and the work should be completed in October, 1922, at an approximate cost of \$175,000.

Lee

Project No. 445 begins at a point on the Sanford-Carthage road, route No. 74, about five miles south of Sanford and runs towards Lemon Springs thence south along the Jonesboro-Aberdeen road to the Moore County line, consisting of 5.9 miles of top-soil roadway estimated to cost \$17,000. Excellent progress is being made on the project and it should be completed by November 1, 1922.

Project No. 446 consists of 5.05 miles of bituminous pavement laid on a concrete base, beginning at the western city limits of Sanford and running in a southerly direction on route 74 to Carthage. The project is estimated to cost \$160,000.

Project No. 446 extended, runs through the city of Sanford, beginning at Endor and Carthage Street and extending along Carthage Street to Hawkins Avenue, thence along Hawkins Avenue to the Northern City limits. It is being paved with bituminous concrete pavement on a concrete base by the State and the town is adding sufficient width to complete the pavement from curb to curb. The estimated cost of construction of the .85 of a mile of street in the project is \$25,000.

Federal Aid Project No. 98-C forms an important link in the Raleigh-Charlotte Highway and extends from the Moore County line towards Sanford, a distance of 4.53 miles. The project which is of sand-clay construction was completed in October, 1921, at a cost of \$17,797.

Orange

Perhaps the most important project in this county is Project No. 453, which is a reinforced concrete bridge over the Eno River at the southern limits of Hillsboro. Construction of this bridge will eliminate an exceedingly

dangerous curve which heretofore existed at the southern approach of the old bridge. The work consists of five 50-foot spans with sidewalks on either side of the bridge and lighting standards at either end. Excellent progress is being made on the bridge which will cost approximately \$31,000.

Project No. 454 consists of 4.28 miles of plain concrete roadway extending from the Durham County line to Chapel Hill. This project together with Federal Aid Project No. 71, mentioned under Durham County report, makes up the University Boulevard. The project which is an excellent example of concrete road construction was completed in March, 1922, at a cost of \$179,741.

Project No. 455 extends from Chapel Hill south to the Chatham County Line on route No. 75, a distance of 4.23 miles, and completes the improvement of the road from Durham to Pittsboro and Siler City via Chapel Hill. The cost of grading and surfacing with top soil together with several concrete structures will be approximately \$42,200.

Project No. 456 extends from Hillsboro 9.87 miles west towards Mebane. The entire road has been relocated to avoid a number of railroad crossings, heavy grades and to conform to the general location adopted east of Hillsboro and west of Mebane. The contract for this project covers the grading, which has been practically completed and the construction of a large reinforced concrete bridge over the Eno River, upon which operations have begun. In all probability this road will be hard-surfaced at an early date.

Person

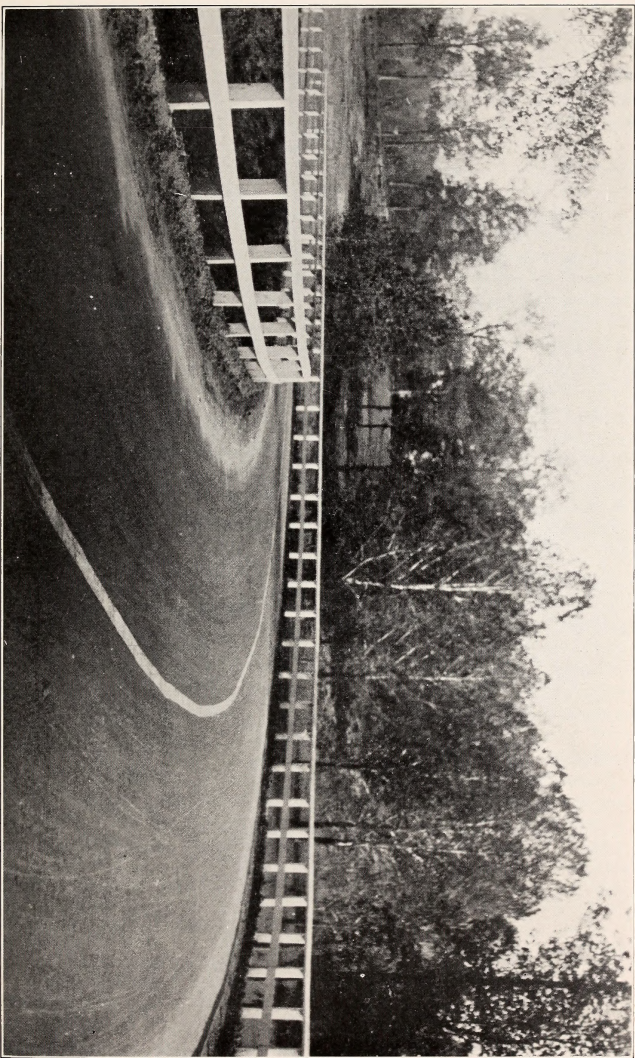
Project 463 consists of 11.8 miles of plain concrete roadway 16 feet in width, extending from the city of Roxboro south along route No. 13 to the Durham County line. This project has been relocated south of Roxboro thereby eliminating two dangerous railroad crossings. The estimated cost of construction being \$297,420.

Vance

Project No. 473, upon which a portion of Federal Aid funds allotted under the Act of November 9, 1921, has been allocated, extends from Henderson 7.75 miles toward Norlina. This road has been relocated at several points with the result of shortening the distance 1.25 miles and the elimination of two dangerous railroad crossings. The contract as awarded calls for the construction of a concrete roadway 18 feet wide laid on a graded roadway 30 feet in width. The estimated cost is \$241,420.

Wake

Project No. 481 constitutes an important link of route No. 10 on the Central Highway in addition to being a part of the highway between Raleigh and Durham. This section of road extends from the Durham County line near Clegg, the end of Project No. 411, to Cary by way of Morrisville, and consists of 7.2 miles of asphaltic concrete pavement laid on a concrete base. Work was begun in April, 1922, and excellent progress is being made. By relocating this project and constructing an underpass at Cary three grade crossings have been eliminated. Approximately \$229,930 will be expended in the construction of this project.



Rock Asphalt Highway—Federal Aid Project No. 71—Durham County

Project No. 482 forms the final link in the hard surface road across Wake County on route No. 10. This project extends from Garner at the end of Federal Aid No. 24 southward to the Johnson County line, a distance of 7 miles. A good rate of progress is being maintained and an excellent quality of work secured. The type of construction is asphaltic-concrete laid on a concrete base, the paving proper being 16 feet wide, the approximate cost being \$174,240. Work should be completed on this road by October, 1922.

Project No. 483, while very short, is of great importance to traffic from the eastern section of the State to points west of Raleigh since it eliminates .5 of a mile of road entering the southern limits of Raleigh, which during the winter season became almost impassable. The project consists of paving a section of South Bloodworth Street between the end of Federal Aid Project No. 24 at the city limits and the end of the hard-surface pavement on Bloodworth Street. The surfacing will be of reinforced concrete and the cost to the State will be \$18,440. The City of Raleigh is adding sufficient pavement on either side of the State standard section to pave the street from curb to curb.

Warren

Two State projects in this county, when completed, will form a hard-surface roadway between Liberia and Norlina on route No. 58. Project No. 492 extends from Liberia northward to Warrenton and consists of 4.49 miles of penetration macadam which will cost \$91,320.

Project No. 493 extends northward from Warrenton to Norlina, a distance of 3.96 miles and is also being surfaced with penetration macadam, the estimated cost of construction being \$70,780.

MAINTENANCE

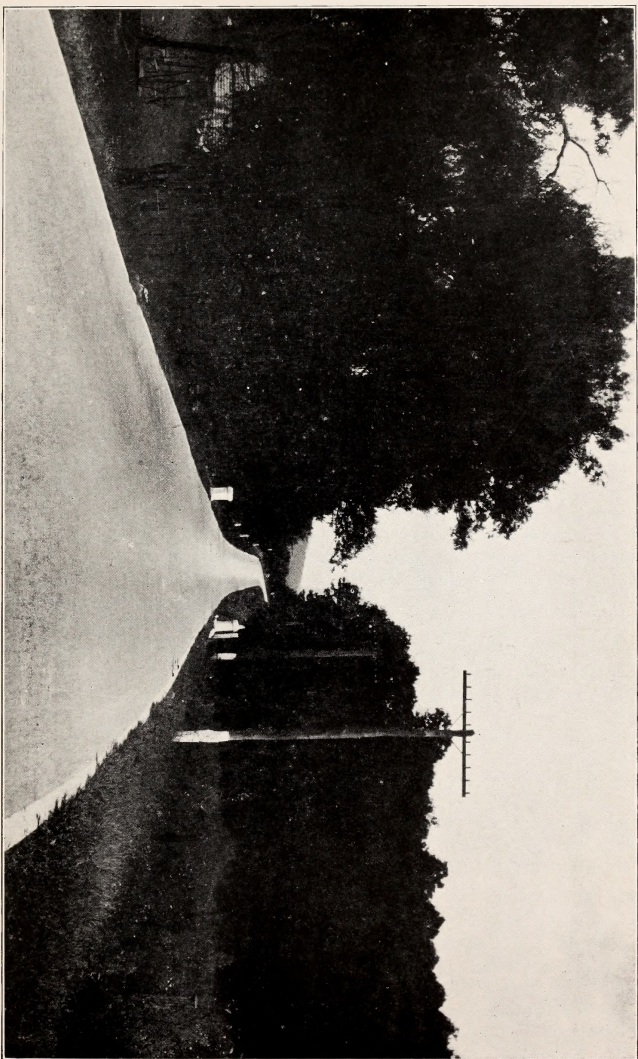
Maintenance work in the Fourth District has been thoroughly taken care of with the result that the roads throughout this district are in excellent condition. In addition to regrading and reconstructing the earth roads the shoulders on hard surface roads have been rebuilt and shade cut back. Where the county roads, when taken over for maintenance, were unusually narrow they have been widened as much as possible.

Considerable attention has been given in this district to the rebuilding of the bridges wherever necessary and in addition to the regular patrol forces a floating bridge gang has been organized which moves from job to job thus enabling the workmen to live at the site of the work. A number of large bridges throughout the district have been reconstructed and guard rails placed at the approaches; all steel bridges have been scraped and painted and their floors renewed. After a period of intensive maintenance shortly after the work was taken over by the State attention was given to the matter of making the highways safer and more convenient for the traveling public. Danger signs have been erected at all curves, railroad crossings, and narrow bridges, while standard route markers have been placed on telephone poles and other objects. In addition to placing guard rails at the approaches of practically all the bridges in this district the rails have been placed on all dangerous fills. These guard rails have all been painted white in order that they may be seen at night and to act as a guide to

the location of the highway. In order that the curves on hard-surface roads may be made safer a stripe 4 inches wide has been painted along the center line of the road. Rather satisfactory results have been obtained from the use of this stripe since the average driver will stay to the right of same, thereby dividing traffic and thus reducing the danger on curves.

In addition to the usual maintenance work calcium chloride has been used as a dust preventive with considerable success on the dirt roads passing through the following towns, Cary, Fuquay Springs, Wake Forest, Wendell, Apex, Pittsboro, Siler City, Zebulon, Youngsville, Franklinton, Macon and a section of the Fuquay Springs road.

Following is a summary of the mileages of the various types of road under maintenance in this district: Hard surface 78 miles, gravel road 75.5 miles, top-soil road 319.6 miles and 170.3 miles of dirt road, making a total of 581.1 miles.



SCENE ON ROUTE NO. 10—BUNCOMBE COUNTY—FEDERAL AID PROJECT NO. 45

FIFTH DISTRICT CONSTRUCTION

This district is made up of the following counties: Alamance, Caswell, Davidson, Guilford, Hoke, Montgomery, Moore, Randolph and Rockingham. The district is in charge of John D. Waldrop, district engineer, with headquarters in Greensboro. Construction work is in charge of R. J. Cassie, construction engineer, while maintenance is in charge of J. S. Easley, maintenance engineer.

Alamance

Construction has been completed on section B of Federal Aid Project No. 22. This project extends from Trollingwood to the Guilford County line via Graham, Burlington and Elon College, excepting that section which is located between Graham and Burlington. The project is 8.3 miles in length, the type of construction plain concrete, and the total cost is \$296,968.

Construction has been completed on Project No. 500 which consists of grading and the construction of drainage structures on 5.22 miles of road between Trollingwood and the Orange County line on route No. 10. The construction of this project cost approximately \$32,732.

Project No. 501, consists of the construction of 13.1 miles of top soil road from Trollingwood north to the Caswell County line. The construction of this project was begun in December, 1921 and when completed will cost approximately \$27,758.

Contract has been awarded for the construction of Project No. 502, which consists of 17.1 miles of top-soil road from Graham to the Randolph County line. This work, including the structures, involves the expenditure of approximately \$138,630.

Contract has been awarded for the construction of a reinforced concrete and steel bridge across Haw River at Haw River Station which will replace the old steel bridge which is now in use. This Project, which is known as Project No. 503, will cost in round figures \$59,500.

Project No. 504 consists of the surfacing with asphaltic-concrete of Project No. 500, mentioned above. The cost of this work is estimated to be approximately \$154,000. Contract was awarded in November, 1921, and is well underway at the present time.

Construction has been completed on Project No. 505, which consists of connecting the sheet asphalt pavement at the western end of pavement in Burlington with the eastern end of F. A. No. 22-A. This project, which is 2,200 feet in length, will cost approximately \$15,300.

Caswell

Construction has begun on Project No. 511, which consists of 14.8 miles of top-soil road between Yanceyville and the Alamance County line. This work will cost, when completed, approximately \$73,242.

Federal Aid Project No. 38-B extending from the Rockingham County line to the Virginia State line on route No. 70, was completed in July, 1921,

at a cost of \$42,033. The type of roadway is top soil throughout the entire length of 6.67 miles. This road is situated on one of our intrastate highways and for this reason a contract has been let by which this project is included for hard surfacing with Federal Aid Project No. 38-A which extends from Reidsville to the Caswell County line.

Federal Aid Project No. 112 extends from the Virginia State line southward to Yanceyville on route 14, a distance of 11.93 miles. Type of construction followed is standard top-soil roadway with concrete bridges. The total cost of construction, which was completed in February, 1922, was \$127,111.

Davidson

Project No. 524 consists of the construction of .3 of a mile of sheet asphalt in the town of Lexington connecting paved streets on route No. 10 with hard-surface projects on either side of the town. This work was done by City authorization at a cost of \$10,835.

Construction is underway on Project No. 525, which includes the grading, drainage and surfacing with asphaltic-concrete of 9 miles of road on route No. 10 from Lexington to the Rowan County line. This work will cost approximately \$363,850.

Project No. 526, which is also under construction, consists of 2.9 miles of plain concrete pavement, on route No. 10, from Thomasville to the Guilford County line and will cost approximately \$130,825.

Federal Aid Project No. 26 extends from Rich Fork Creek to the Guilford County line on route No. 10, omitting the town of Thomasville, a distance of 8.41 miles in length, top-soil type and cost \$13,592.

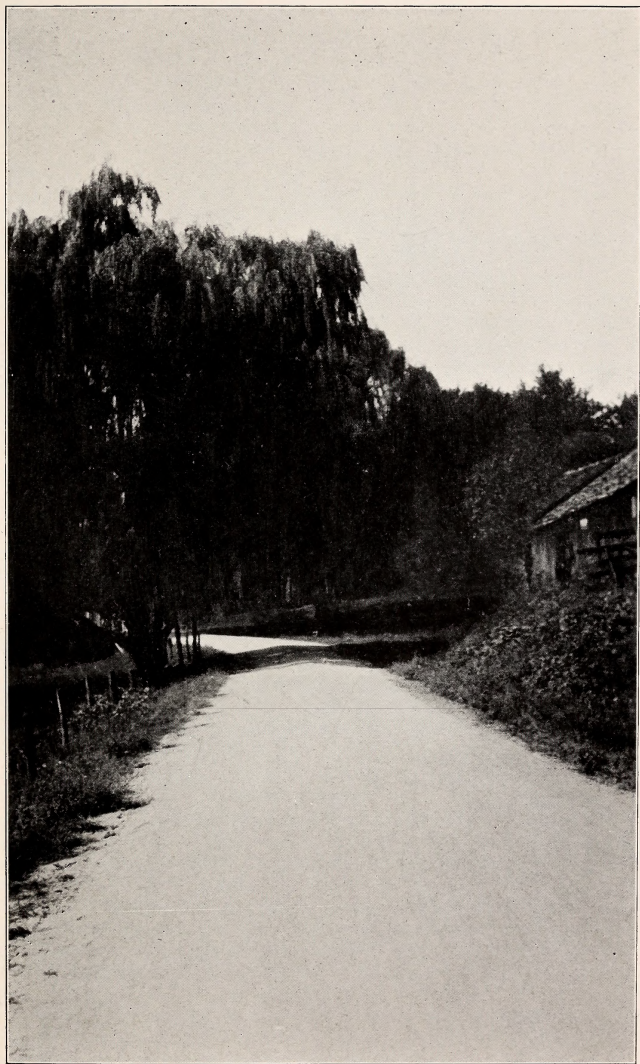
Federal Aid Project No. 82 extends from the Guilford County line to the Forsyth County line on route 77, being a part of the High Point-Winston-Salem Highway. The project is 4.5 miles in length and was originally contracted for grading and top-soil surfacing but due to plans being perfected to hard-surface the above mentioned highway, surfacing was omitted from this project. The work of grading and building several concrete bridges on this project was completed in October, 1921, at a total cost of \$67,505. This project is now situated in Forsyth County by an Act passed by the 1921 session of the General Assembly.

Guilford

Project No. 532 consists of 11.7 miles of asphaltic-concrete roadway from the east end of F. A. Project No. 47 to the Alamance County line in Gibsonville. Construction is underway on this project and will cost, when completed, approximately \$386,000.

Project No. 533, part of which is located in Forsyth County, consists of the construction of 10.59 miles of plain concrete roadway from the corporate limits of High Point toward Winston-Salem and forms a link of the hard-surface road between these towns. Construction was begun on this project in July, 1921, and is at the present time very near completion. The project will cost, when completed, approximately \$428,000.

Contract has been awarded for the construction of Project No. 538, which consists of a bridge on route No. 77 about 2 miles southeast of High Point. This bridge will cost approximately \$7,040.



AN EXAMPLE OF STATE MAINTENANCE—ROUTE NO. 20—MADISON COUNTY

Construction is in progress on Project No. 539, which consists of .6 of a mile of sheet-asphalt pavement on Montelieu Avenue in High Point. This project will cost approximately \$21,640.

Federal Aid Project No. 47, a link of the Central Highway, extends from the corporate limits of Greensboro in an easterly direction four miles towards Gibsonville. It is of the hard-surface type being surfaced with Warrenite on a concrete base and was built at a total cost of \$124,969, construction being completed in April, 1921.

Federal Aid Project No. 50 extends from Edwards Cross Roads, on route No. 60, to a point one-half mile west of Guilford College Station, a distance of two miles. In the construction of this project a portion of the old macadam roadway was used as a base course, while a cement concrete base was laid where the old road was worn so as to render it unsuitable as a base course. Warrenite surfacing was laid on this base course. Construction was completed in December, 1920, at a cost of \$100,765.

Federal Aid Project No. 51 is also a link in route No. 10 and replaces a worn out macadam road which had become almost impassable. It is located between High Point and Thomasville, ending at the Davie County line, a distance of 2.26 miles. The type of construction is identical with that of Federal Aid Project No. 50 and the cost \$88,008. Construction was completed on this project in October, 1921.

Hoke

Project No. 544, located between Raeford and the Robeson County line, a distance of 9.9 miles. This road will be of the sand-clay type and will cost approximately \$32,445.

Project No. 545 consists of the construction of 9.2 miles of top-soil road from Raeford to the Scotland County line and will cost, when completed, approximately \$58,200.

Only one project has been completed in this county, this being Federal Aid Project No. 105 extending from the center of the town of Raeford towards the Cumberland County line on route No. 24, a distance of 9.81 miles. It is of the sand-clay type and cost \$94,931. Construction was completed on this project October, 1921.

Montgomery

Federal Aid Project No. 33 extends from the corporate limits of Mount Gilead to Wadeville, a distance of 3.72 miles. The roadway is of the top-soil type and cost \$16,758, construction on same having been completed in June, 1921.

Federal Aid Project No. 80-A extends from the Yadkin River at the Stanly County line to the west corporate limits of Troy, on route No. 74, a distance of 16.6 miles, the cost of construction being \$211,136, which covers the grading, surfacing with top soil and the construction of the necessary concrete bridges. This work was completed in June, 1921.

Federal Aid Project No. 80-B extends from the west corporate limits of Troy to the Moore County line toward Sanford. It is 11.07 miles in length and is similar in construction to Project No. 80-A and cost \$67,625.

One of the most important projects completed by the State Highway Commission during the period covered by this report is the construction of Federal Aid Project No. 116, or what is known locally as the Swift Island Bridge. The project is located over the Yadkin River between Troy and Albemarle, forming a connecting link in the highway between Raleigh and Charlotte, and by means of which the route is shortened approximately 35 miles.

Moore

Construction is in progress on Project No. 566, which includes the construction of 7.14 miles of top-soil road from Aberdeen to the Richmond County line. When completed this work will cost approximately \$60,000.

Construction is in progress on Project No. 567, located between Aberdeen and the Hoke County line, a distance of 2.96 miles. This work will cost, when completed, approximately \$7,700.

This County is traversed throughout its entire length by Federal Aid Project No. 98, this project being divided in two sections A and B. Federal Aid Project No. 98-A extends from the Montgomery County line to the Court House in Carthage, a distance of 20.53 miles. It is surfaced partly with top soil and partly with gravel and is drained with standard concrete culverts and bridges. Construction was completed in May, 1922, at a cost of \$257,975.

Section B extends from the Court House at Carthage to the Lee County line, both of these projects being on route No. 74. This project is 8.75 miles in length, of similar construction to Project No. 98-A and cost \$35,558. Construction was finished in March, 1922.

Randolph

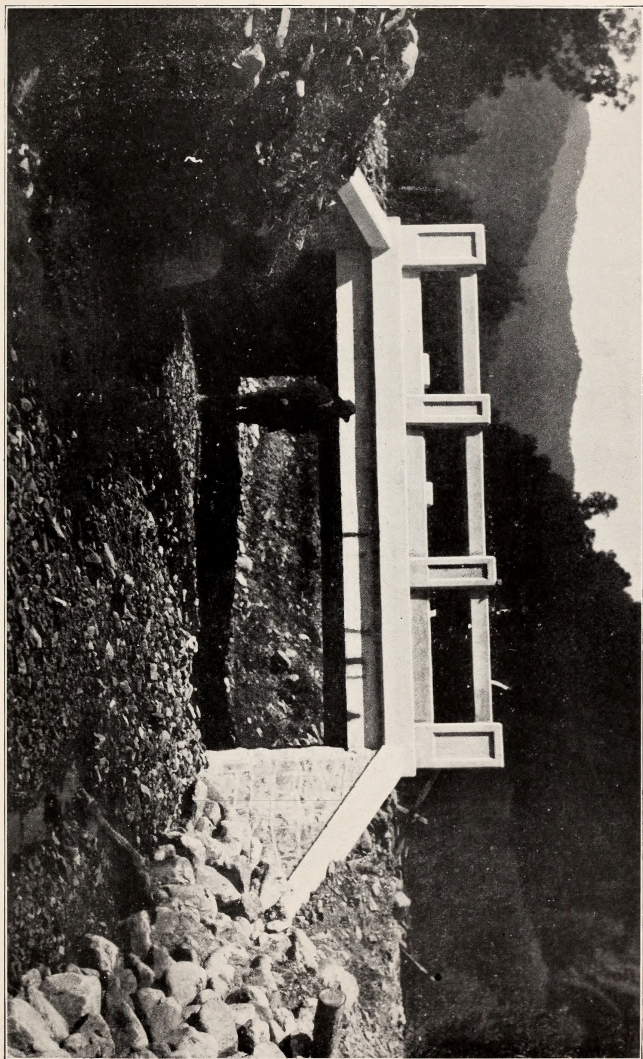
Project No. 577 consists of 13.4 miles of plain concrete roadway from Archdale to a point below Randelman on route No. 77. Construction was begun in April, 1922, and very satisfactory progress is being made at the present time. The work will cost approximately \$422,344.

Federal Aid Project No. 101-A and No. 101-B extend from the forks of the Greensboro road two miles north of Asheboro to the Alamance County line on route No. 62, Project No. 101-A being 10.04 miles in length ending at Grays Chapel while Project No. 101-B is 9.04 miles long and extends to the Alamance County line. Both projects are surfaced with top soil and drained by standard structures. Project No. 101-A, which was completed in August, 1921, cost \$121,333 while Project No. 101-B, which was completed in March, 1922, cost \$99,632.

Rockingham

Project No. 588 consists of the construction of 7.98 miles of reinforced concrete pavement from the end of the paved street in Reidsville to the corporate limits of Wentworth. Construction, which was begun in April, 1922, will cost \$266,500.

Federal Aid Project No. 38 extends from the corporate limits of Reidsville to the Caswell County line on route No. 70, a distance of 10.92 miles. It is of the top soil type and cost \$44,851. This project was authorized to



TYPE OF SMALL BRIDGE AS CONSTRUCTED IN WESTERN PART OF STATE

be hard surfaced in March, 1922, and contract has been awarded for this work. The paving on this project together with that on Project No. 38-B, in Caswell County, has been designated as State Project No. 593 and will be surfaced with one course of plain concrete pavement at an estimated cost of \$302,176.

MAINTENANCE

Of a total of 702.7 miles in this district, 578.95 miles are under maintenance by patrol forces. Since the work has been taken over by the State Highway Commission the maintenance consists of bringing the top soil and sand-clay roads into first-class condition, in building up shoulders on hard surface roads and in rebuilding a number of bridges throughout the district. A large part of the work of rebuilding the bridges has been done by the floating bridge gangs which move over the entire district rebuilding and making such repairs to bridges as may be deemed necessary. In addition to the patrolmen throughout the district there are two floating road gangs who work over the entire district and handle all work too heavy for the patrolmen. A sharp curve in the vicinity of the Southern Railroad underpass between Greensboro and High Point has been widened considerably and an additional width of pavement constructed by one of these floating gangs.

In addition to the routine maintenance of keeping the soil roads in condition a great deal of work has been done in placing route markers on telephone posts, placing danger signs at sharp curves, and narrow bridges and in placing direction and distance markers.

SIXTH DISTRICT

CONSTRUCTION

The following counties compose the Sixth District: Alexander, Anson, Cabarrus, Catawba, Gaston, Iredell, Lincoln, Mecklenburg, Richmond, Rowan, Scotland, Stanly and Union. The district is in charge of J. B. Pridgen, district engineer, with headquarters in Charlotte. Construction is in charge of J. L. Gregson, Jr., construction engineer, while maintenance work is in charge of J. C. Carpenter, maintenance engineer.

Alexander

Contract has been let and construction begun on the grading of Project No. 600, located between Taylorsville and the Iredell County line, a distance of 9.3 miles. At the present time this road will only be graded but plans have been made for the awarding of surfacing contract at an early date. The grading and structures will cost approximately \$11,392.

Project No. 601 consists of the construction of a top-soil road between the Caldwell County line and the end of the improved road near Taylorsville on route No. 75. This work will cost approximately \$30,573.

Federal Aid Project No. 18, which is located between Taylorsville and the Wilkes County line, on route No. 77, was completed in March, 1921, at a cost of approximately \$59,593, one-half of which was paid from Federal Aid funds and the remainder by the county. This work consists of 9.8 miles of top-soil road.

Anson

Contract has been awarded and work begun on the construction of State Project No. 606, consisting of a bridge over Rocky River on route No. 80, between Albemarle and Wadesboro. The bridge consists of ten 50-foot reinforced concrete deck girder spans, having nine piers and two abutments, the total cost of construction being in round figures \$49,780.

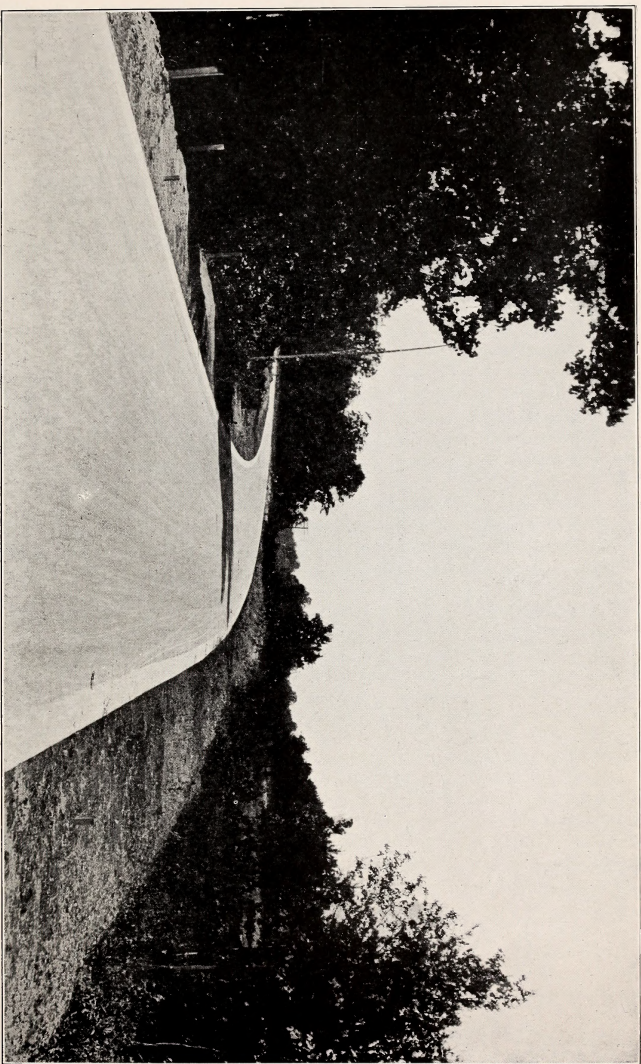
Construction is under way on Project No. 607, which consists of a top-soil road between Wadesboro and the Stanly County line, a distance of 6.4 miles. This work will cost approximately \$33,726, including structures.

Federal Aid has been received on only one project in this county, this being Federal Aid Project No. 72, consisting of 3.9 miles of road on route No. 20, from Polkton to the Union County line. Contract was awarded for this work in April, 1920, and the work completed in July, 1921, at an approximate cost of \$72,635, of which one-half was paid by Federal Aid funds, one-quarter by Anson County and one-quarter by the State Highway Commission.

Cabarrus

At the present time there are no State Projects under contract or construction in this county.

Construction has been completed on two Federal Aid Projects, namely, Federal Aid Project No. 52 consisting of 8.99 miles of road on route No. 74



PROJECT 638—IREDELL COUNTY—CHARLOTTE-STATESVILLE HIGHWAY

from the Stanly County line toward Concord, and Federal Aid Project No. 76, consisting of 1.35 miles of asphaltic-concrete road between Kannapolis and Glass, on route No. 15. Work was completed on the former in July, 1921, at a cost of \$154,178, this figure including the grading, drainage and top-soil surfacing. Work was completed in January, 1921, on Federal Aid Project No. 76, at a cost of \$51,410.

Contract has been let for the construction of Federal Aid Project No. 144, known as State Project No. 614. This project extends for a distance of 9.2 miles from the Mecklenburg County line to Concord on route No. 15. The contract calls for the construction of a one-course concrete road at an estimated cost of \$318,259. Federal Aid funds for the construction of this project will be secured from the allotment under the Federal Aid Act of November 9, 1921.

Catawba

Construction is under way on State Project No. 622, which is located between Newton and the Burke County line via Hickory, a distance of 11.1 miles. This road will be surfaced with asphaltic-concrete laid on a cement concrete base. The cost of construction will be approximately \$322,110.

Contract has been awarded for the construction of 7.53 miles of concrete road from Newton to the Lincoln County line, the work being known as Project No. 629. Cost of construction, including structures, is estimated to be \$244,238.

Gaston

Work has been practically completed on Project No. 630-A, which consists of the construction of an asphalt concrete road between Gastonia and Dallas, a distance of 3.2 miles. Contract was let for this work in October, 1921, at an estimated cost of \$89,448.

Construction is under way on Project No. 632, which consists of a one-course reinforced concrete road from Gastonia to the Cleveland County line via Bessemer City. This project will cost in round figures \$263,712 for the 9.5 miles included.

Project No. 634 consists of repairing a steel bridge across the south fork of the Catawba River. This work is being done by forces of the State Highway Commission and should be completed in the early fall at an estimated cost of \$4,000.

Construction was completed in December, 1921, on Federal Aid Project No. 37, consisting of 10.38 miles of penetration macadam from Gastonia to the Mecklenburg County line, on route No. 20. Work was done by the Gaston County Commissioners at an approximate cost of \$155,876, one-half of which was paid from Federal Aid funds and the remainder by Gaston County.

Iredell

Contract has been awarded for the construction of State Project No. 638, consisting of 7.88 miles of asphaltic concrete road from Mecklenburg County line to Shepard, on route No. 26. This work will cost approximately \$238,311.

Contract has also been awarded for the construction of Project No. 639, which extends from the end of Project No. 638, at Shepard to Statesville,

a distance of 10.39 miles. The type of construction is identical with that of Project No. 638 and including structures will cost \$352,132.

Lincoln

Contract has been let for the construction of Project No. 647, consisting of 7.1 miles of plain concrete roadway from Lincolnton to the Catawba County line, on route No. 16. This project together with Project No. 629, which has been mentioned, constitute the hard-surface highway between Lincolnton and Newton, connecting at that point with Project No. 622, which is being hard-surfaced to the Burke County line. Cost of construction is estimated to be \$227,371.

Mecklenburg

Construction has been completed on Federal Aid Project No. 30, which over McAlpine Creek. The cost of construction of the project, which is known as Project No. 652, was completed at a cost of \$3,000.

Construction is in progress on Projects No. 653 and No. 654 which, together with Projects No. 638 and No. 639, mentioned under Iredell County report, constitute the Charlotte-Statesville Highway.

Contract for the construction of Project No. 653 was awarded in December, 1921, and calls for the construction of 8.84 miles of asphaltic-concrete roadway from Charlotte northward toward Statesville, on route No. 26. The project will cost including structures \$280,666.

Project No. 654 is similar in construction to the above mentioned project and extends from the end of Project No. 653, at Huntersville to the Iredell County line, a distance of 10.01 miles. Work which was begun in April, 1922, will cost approximately \$274,334.

State Project No. 655, construction of which is practically complete, consists of the construction of one and one-half miles of one-course concrete road from the end of pavement in Charlotte to the end of Federal Aid Project No. 55-A, on route No. 20, and will cost \$57,904.

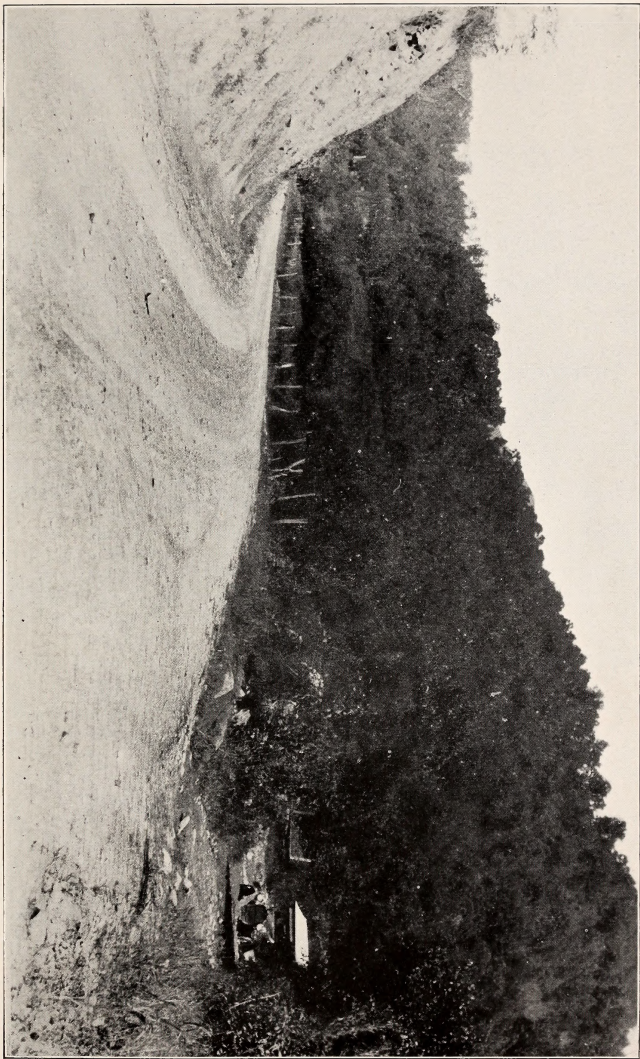
Project No. 656 consists of the reconstruction of 10.4 miles of road from Charlotte to the Gaston County line, on route No. 27. This work was begun by State forces in October, 1921, and on June 30 was approximately 75 per cent complete. This road will be of surface-treated macadam and the work of reconstruction will cost approximately \$10,000.

Project No. 657 consists of the reconstruction of 13.8 miles of road, on route No. 26, from Charlotte to the South Carolina line. This road will likewise be of surface-treated macadam and cost approximately \$13,000.

Construction has been completed on Federal Aid Project No. 30, which extends from Charlotte to the Gaston County line, on route No. 20, a distance of 6.3 miles. This road is of penetration macadam and cost, in round figures, \$102,551.

Work has been completed on Federal Aid Projects No. 55-A and 55-B constituting a link of route No. 20 from the Mecklenburg County line to the Union County line, a distance of 10.6 miles. Both of these roads are constructed of penetration macadam and cost approximately \$370,697.

NEW AND OLD ROAD—PROJECT NO. 951—JACKSON COUNTY



Richmond

No State Projects are under construction at the present time in this county.

Work was completed in January, 1922, on Federal Aid Project No. 129, which consists of 17.2 miles of sand-clay road from the Moore County line to Hamlet, on route No. 204. The cost of construction of this project was \$67,516, one-half of which was paid from Federal Aid funds and the remainder divided equally between the county and the State.

Rowan

Contract was let in June, 1922, for the construction of Project No. 670, which calls for a one-course concrete road located between Kanapolis and Landis, a distance of 4.4 miles. The work will cost approximately \$129,292.

Work was completed in May, 1921, on Federal Aid Project No. 114, consisting of 2.54 miles of asphaltic-concrete roadway between Spencer and the Yadkin River Bridge, the cost of construction being \$76,679, this expenditure being divided equally between the Federal Government and Rowan County.

Construction was completed in May, 1921, on Federal Aid Project No. 57, consisting of the construction of 6 miles of top-soil road and .75 of a mile of asphaltic-concrete road from Salisbury to the Yadkin River, on route No. 80. The total cost of construction of this project was \$68,970, one-half of which was paid from Federal Aid funds and the remainder by Rowan County.

Scotland

Contract was let in April, 1922, for the construction of a reinforced concrete road between Lourinburg and Maxton, a distance of 5.7 miles. Work will cost in round figures \$257,691.

Stanly

At the present time there are no State Projects under construction in this county.

Federal Aid Project No. 42 was completed in September, 1920. This project consisted of the construction of a top-soil road between Albemarle and Norwood, the cost of construction being \$96,645 for the 11.67 miles included in the project.

Federal Aid Project No. 74-A was completed in August, 1920. This project together with Federal Aid Project No. 74-B, which was completed in September, 1920, constitutes the road between Albemarle and the Yadkin River, a distance of approximately seven miles. Both of these roads are surfaced with an excellent quality of top soil and cost in round figures \$106,180.

This county participated, together with Montgomery County, in the construction of Project No. 116, which is mentioned in the Montgomery County report.

Union

Work was completed in March, 1922, on State Project No. 692, consisting of 2.28 miles of asphaltic-concrete road located on route No. 20, on either side of the Town of Monroe. This work cost in round figures \$60,924.

Construction is in progress on State Project No. 695, consisting of 4.6 miles of asphaltic-concrete roadway between the end of Project No. 692 and the Mecklenburg County line, a distance of 4.3 miles. This work will cost, when completed, approximately \$127,183.

Three Federal Aid Projects have been completed in this county, namely, Projects No. 29, No. 39 and No. 40. Project No. 29 consists of 8.66 miles of top-soil road located between the Anson County line and the Monroe township line on route No. 20 and was completed at an approximate cost of \$58,950.

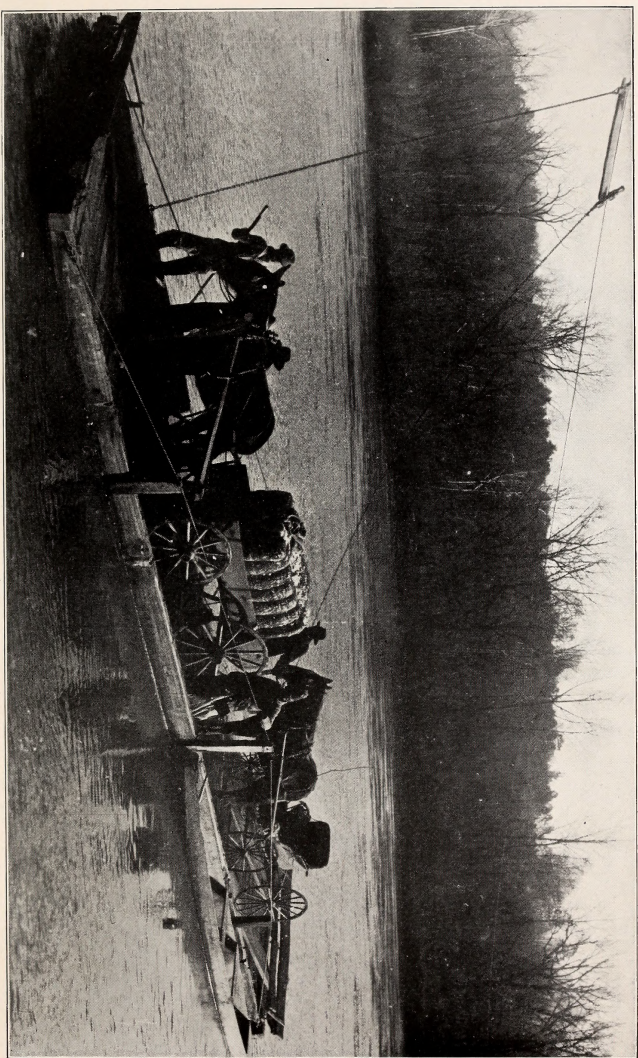
Federal Aid Project No. 39 was completed in July, 1921, at a cost of approximately \$74,338. This project which is also of top-soil construction is located between Monroe and Marshville, a distance of 12.89 miles.

Federal Aid Project No. 40 is also of top-soil construction was completed in September, 1920, at an approximate cost of \$16,247. This extends from the Mecklenburg County line toward Monroe for a distance of 4.3 miles.

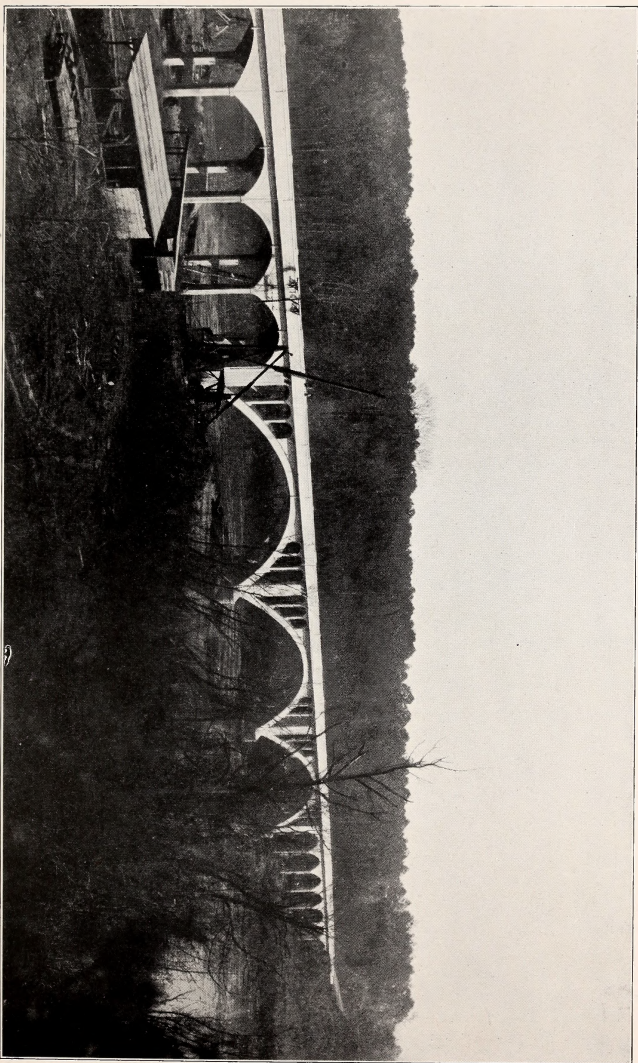
MAINTENANCE

In addition to the mileage which is under construction in the Sixth District and which will be taken over for maintenance when completed, there are 646 miles of the State Highway System under maintenance by patrol forces of the commission. This mileage is divided according to type as follows: top-soil and sand-clay roads 424.8 miles, graded or dirt roads 90.9 miles and 130.3 miles of hard-surface road, the latter figure including macadam roads of the various types. The roads throughout the district with very few exceptions are in good condition at all seasons of the year. More marked improvement will be noted when several of the construction projects are completed and these roads taken over for maintenance.

In this district routine work has been carried out, bridges rebuilt and refloored, standard route markers, danger signs and direction signs placed.



OLD—SWIFT ISLAND FERRY



NEW—SWIFT ISLAND BRIDGE—FEDERAL AID PROJECT NO. 116

SEVENTH DISTRICT

CONSTRUCTION

The Seventh District is composed of the following counties: Alleghany, Ashe, Caldwell, Davie, Forsyth, Stokes, Surry, Watauga, Wilkes, and Yadkin. The district is in charge of C. S. Currier, district engineer, with headquarters at Elkin. Construction is in charge of R. W. Parks, construction engineer, maintenance being in charge of U. L. Fisher, maintenance engineer.

Alleghany

Construction is in progress on Federal Aid Project No. 125-A, which consists of grading, drainage and surfacing with penetration macadam of 4.99 miles of road from Sparta toward Elkin, on route No. 26. The project was 77 per cent complete on June 30, 1922, total estimated cost of construction being \$171,077.

Construction is also in progress on State projects No. 700 and No. 701. These projects are located on route No. 26 and form a part of the highway between Elkin and Sparta. Project No. 700 is 7.9 miles long, while Project No. 701 is 8 miles long. The type of construction in each case being similar to that of Federal Aid Project No. 125-A. On all three of these projects it was first intended to lay a water-bound macadam but on account of the poor quality of the local stone it was deemed advisable to change the type of construction as shown herein.

Ashe

Project No. 710 consists of 3.14 miles, a section of concrete road connecting the towns of Jefferson and West Jefferson, contract for which was awarded in September, 1921. Work has been practically completed on this project at the present time and the cost of construction will be approximately \$129,716.

Caldwell

The Caldwell County Highway Commission completed during the early part of 1921, the grading and structures on the road from Lenoir to the Burke County line, on route No. 18, and not having sufficient funds with which to surface this roadway petitioned the State Highway Commission to take the work over and lay the necessary surfacing material. This project, which is known as Project, No 722. was begun by a force of the State Highway Commission in August, 1921, and completed in January, 1922, at a total cost of \$18,745, this covering the top soiling and building concrete headwalls on the 7.4 miles of road included in the project.

Project No. 719 consists of a bridge over the Catawba River between Lenoir and Hickory, on route No. 17, contract for which was awarded on June 14, 1922, the bid price being \$4,857.

Project No. 724 consists of 4.66 miles of grading, drainage structures and top-soil surfacing on Project No. 725, description of which follows. These two projects form an important link of improved road from the Alexander

County line to within about three miles of Lenoir and the county has built a good top-soil road the remainder of the way, to intersect with route No. 18, thus connecting Lenoir and Wilkesboro. Project No. 725 consists of grading, laying pipe lines and top-soil surfacing on two miles of this road. Work which was done by forces of the State Highway Commission was begun in November, 1921, and is practically complete. The estimated cost of Project No. 724 is \$47,173, while the cost of Project No. 725 is \$27,000.

Davie

Construction was completed in December, 1921, on Federal Aid Project No. 136, which consists of grading and top-soiling 6.99 miles of road on route No. 65, between Mocksville and Winston-Salem. The cost of construction on this project was \$66,164.

Contract was let in March, 1922, for State Project No. 731, which consists of grading, draining and laying a plain concrete pavement on 5.46 miles of road between Mocksville and Winston-Salem. To date this project is 24 per cent complete. The total cost of construction is estimated to be \$177,630.

Forsyth

Construction has been completed on Federal Aid Project No. 111, extending from Winston-Salem to the Stokes County line via Rural Hall, on route No. 66. This is a top-soil project 12.09 miles long, and including structures, cost \$95,656.

Project No. 741 was let to contract in June, 1922, the contract calling for the construction of 8.9 miles of reinforced concrete pavement from Haynes to the Davie County line, on route No. 65. The estimated cost of construction is \$286,387.

Project No. 744 is a top-soil project two and one-half miles extending from Belews Creek to the Guilford County line. This project is being built under the supervision of the State Highway Commission but is being financed by Forsyth County. The estimated cost of construction is \$34,750.

Stokes

Federal Aid Project No. 121 extends from the Forsyth County line to the Surry County line, on route No. 66. The roadway is of top-soil type and is 11.6 miles long. Work was completed in January, 1922, at a cost of \$118,715.

State Project No. 750 extends from the Surry County line to Clemmons Ford, a distance of 14.86 miles. This is a top-soil project, work on which was begun in September, 1921, and which will cost in round figures \$85,000.

Project No. 751 extends from the Forsyth County line to the Rockingham County line via Pine Hall. Contract, which was awarded in October, 1921, called for surfacing with top soil and will cost \$28,861 for the 7.61 miles included.

Surry

Work was completed on Federal Aid Project No. 91 in June, 1921. This project is 10.68 miles in length, extending from Mount Airy to the Stokes County line at Westfield. The road is of the top-soil type and cost \$120,367.



Old Road on Project No. 930—Graham County

Federal Aid Project No. 92 extends from Mount Airy westward to Dobson on route No. 80 and is also of the top-soil type construction. The project was completed in June, 1921, at a cost of \$147,402.

Project No. 760 is a top-soil road 6.91 miles in length between Doughton and the State road on route No. 26. The estimated cost of construction of this project is \$22,171.

Watauga

Federal Aid Project No. 41 consisting of grading and draining 8.95 miles of roadway from the Wilkes County line toward Boone was let to contract in December, 1920, and construction completed in November, 1921, at a cost of \$101,868.

The following projects have been authorized for construction by State forces, Project No. 770-A from Boone 3 miles toward Blowing Rock. The authorization covers reconstruction of roadbed, drainage structures and surfacing with water-bound macadam. Project No. 770-B extends from the end of Project No. 770-A to the Caldwell County line near Blowing Rock. The roadway and structures will be reconstructed and gravel surfacing laid. Penetration macadam will be placed on Project No. 771-A from Boone for a distance of two and one-half miles toward the Tennessee State line. Project No. 771-B extends from the end of Project No. 771-A to the Tennessee State line and includes thirteen and one-half miles of gravel surfacing.

Project No. 783 is being constructed by State forces and includes the surfacing of the highway from Boone to the Wilkes County line. The surfacing consists of 3 miles of penetration macadam from Boone eastward and 15 miles of gravel over the remainder of the road. Work was begun in September, 1921, and on June 30, the macadam was approximately 95 per cent complete, while four miles of the gravel surfacing had been completed.

Wilkes

Federal Aid Project No. 17 which consists of the grading and drainage of 17.55 miles on route No. 60, from Purlear to the Watauga County line, was begun in October, 1918 and on June 30, was 93 per cent complete.

About 1907 the State built, with convict labor, a graded road from Wilkesboro up Reddies River, across the Blue Ridge to Jefferson. During the flood of 1916, the Reddies River valley was perhaps as badly damaged as any other part of the State and this road was washed away for several miles and has since been impassable. In August, 1921, the reconstruction was begun by State forces and to date about 60 per cent of the grading has been done. The project is approximately 15 miles long and consists of the reconstruction of the roadway, drainage structures and surfacing with gravel. It is estimated that there are approximately one hundred thousand cubic yards of solid rock to be moved in regarding this road, as all of the soil covering was completely washed away by the flood, leaving the cliffs naked rock. The estimated cost of this project is \$125,000.

Contract for the construction of State project No. 782 was awarded in February, 1922 and to date is 13 per cent complete. The contract covers the construction of a reinforced concrete roadway from North Wilkesboro to Millers Creek, a distance of 5.97 miles at an estimated cost of \$167,831.

Project No. 783 consists of the surfacing with top soil and gravel of 17.55 miles of Federal Aid Project 17. This work, which is being done by State forces, was begun in September, 1921, and to date 15 miles have been surfaced.

Project No. 780-A consists of the reconstruction and top-soiling of approximately seven and one-half miles of road and the building of two bridges. This work was done by State forces and has been completed.

Yadkin

Construction was completed on Federal Aid Project No. 20 in July, 1920, at an estimated cost of \$18,744. This is a top-soil project, 6.41 miles in length, located between Yadkinville and Brooks Cross Roads.

Contract was awarded in April, 1922, for Project No. 790, which consists of 10.12 miles of plain concrete pavement from Elkin to Brooks Cross Roads on route No. 26. Approximate cost of this work is estimated to be \$300,231.

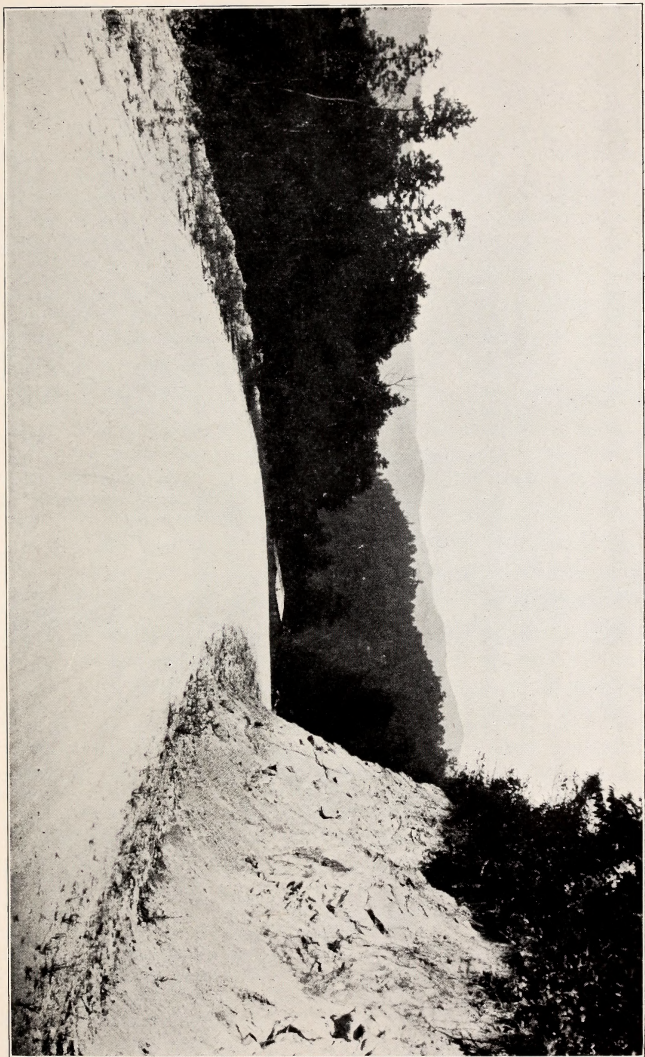
MAINTENANCE

The total mileage of State roads under maintenance included in the ten counties composing this district is 740.06 miles; of this mileage 679.8 miles are now under maintenance as follows; 329.9 miles of top-soil road, 144.4 miles of dirt road, 32.7 miles of hard-surface and 172.8 miles of unimproved road. The roads not under maintenance are either under construction or were in such condition that they could not be placed under maintenance except by an excessive expenditure of maintenance funds. The top-soil roads are being maintained by dragging, machining and resurfacing with suitable material the portion of road which has worn out. The concrete sections of hard-surface roads are being maintained by building up the earth shoulders and by cleaning and refilling of expansion joints and cracks.

The penetration macadam and surface treated roads are being maintained by either retreating the whole length or by patching sections. The dirt roads are being maintained by dragging and, whenever necessary, machining, while the unimproved roads are merely kept so as to be passable since considerable reconstruction would be necessary to bring them up to the maintenance standard set by the commission.

When the roads were taken over in this district by the State, a large amount of work was necessary to clean the right of way of the entire mileage of brush and trees that cut off the view on the curves and that prevented the soil roads from drying out. A large number of pipe culverts were placed to provide proper drainage and the bridges throughout the district were reconstructed and strengthened. Guard rails have been, or are being built, at all bridge approaches and at dangerous curves; standard danger signs are being erected, route markers painted on telephone poles, and direction and distance signs erected on all improved roads.

GRAVEL ROAD IN HAYWOOD COUNTY ON ROUTE No. 10



EIGHTH DISTRICT

CONSTRUCTION

This district is composed of the following counties: Avery, Burke, Cleveland, Henderson, McDowell, Mitchell, Polk, Rutherford and Yancey. This district is in charge of H. E. Noell, district engineer, with headquarters in Marion. Construction is in charge of C. H. Moore, construction engineer, while maintenance in this district is in charge of A. P. Eskridge, maintenance engineer.

Avery

Construction was completed in March, 1922, on Federal Aid Project No. 100-A. This project extends from Cranberry, south 7 miles toward the Mitchell County line via Minneapolis. A surfacing of water-bound macadam, 15 feet wide, has been laid at a cost of \$161,181.

Federal Aid Project No. 100-B begins at the south end of the above project and extends a distance of 7 miles to the Mitchell County line. Construction on this project which is of the gravel type, was completed in March, 1922, at a cost of \$125,925.

Project No. 801 consists of a stretch of road one mile in length from Newland, north toward Cranberry. A 16-foot water-bound macadam surfacing is being laid which is estimated to cost \$22,250.

Burke

Federal Aid Project No. 84-A extends from a point near Bridgewater on route No. 10 to the McDowell County line, a distance of 1.4 miles. Construction of this section of the project was completed in August, 1921, at a cost of approximately \$21,000.

Federal Aid Project No. 109 extends from the eastern city limits of Morganton 3.62 miles toward Valdese and was completed in May, 1921, at a cost of \$43,911. It is of the top-soil type, the surfacing of roadway being 16 feet in width.

Project No. 811, located from Morganton to Glen Alpine, 5.24 miles, is of the plain concrete type, the paved roadway being 18 feet wide. Construction was begun in January, 1922, and at the present time is approximately 13 per cent complete. The project will cost, in round figures, \$168,300.

Cleveland

Construction on Federal Aid Project No. 79-A, extending from the Gaston County line to the west corporate limits of Kings Mountain, 1.65 miles, was completed in October, 1920, at a cost of \$25,679. The roadway is of the standard asphaltic-concrete surfacing laid on a cement-concrete base.

Project No. 823 extends from Shelby to Cleveland Springs, a distance of 1.9 miles. Construction was completed in May, 1922, at a cost of \$69,535. The road is of the asphaltic-concrete type.

Henderson

Project No. 833 extends from Horse Shoe to the Transylvania County line, a distance of 5.2 miles, is of top soil and sand-clay, and when completed will cost approximately \$31,775.

McDowell

Federal Aid Project No. 84-A, which has its beginning in Burke County extends into McDowell County a distance of 6.99 miles. This project is of the top-soil type and was completed in August, 1922, at a cost of \$101,738.

Federal Aid Project No. 84-B is located on route No. 10 and begins at the end of the above mentioned project and extends to a point 2.2 miles west of Marion, the total length being 6.78 miles. The roadway is surfaced with top soil and was completed in October, 1921, at a cost of \$110,670.

Project No. 844 is located between Marion and Marion Junction, a distance of 2.05 miles. It is of the plain concrete type, 18 feet in width and was completed in December, 1921, at a cost of \$58,606.

Project No. 845 consists of the construction of a gravel road from a point near the Catawba River in a westerly direction 7.19 miles on route No. 10. At the present time the project is approximately 76 per cent complete and will cost, when completed, in round figures \$120,162.

Project No. 846 begins at the west end of Project No. 845 and extends to Ridgecrest, a distance of 10.06 miles. The type of construction is identical of the above mentioned project and the project, when completed, will cost approximately \$186,073.

Mitchell

There are at the present time under construction in Mitchell County four projects, the first of which was begun under the former administration and will be paid for in part from Federal Aid funds. The remaining three will be paid for wholly out of State funds.

Federal Aid Project No. 94-A begins at the Mitchell-Avery County line and extends in a westerly direction 5.04 miles through the town of Spruce Pine. The surfacing used on this project is plain concrete, 14 feet in width and when completed, the road will cost in round figures \$119,516.

Project No. 855 consists of 4.72 miles of plain concrete road from the west end of Federal Aid Project No. 94-A to the Yancey-Mitchell County line between Spruce Pine and Burnsville. The estimated cost of construction of this project is \$158,540. Project No. 855-B consists of the building of the structures on the last mentioned project. At the time the contract was awarded for Project No. 855 no satisfactory bids were received for the structures and for this reason contract for these structures was not let until a later date. Construction of this project was completed in August, 1922, at a cost of \$6,776.

Project No. 856 consists of grading, drainage and penetration macadam surfacing of 6.88 miles of road from Spruce Pine to Ledger on route No. 19. Construction was begun on this project in March, 1922, and at the present time is 6 per cent complete. Work will cost, when completed, \$217,585.

Project No. 860 covers the grading and surfacing with waterbound macadam of 6.65 miles, on route No. 19, between Ledger to Bakersville. Work was

SCENE ON PROJECT NO. 930—GRAHAM COUNTY



begun on this project in April, 1922, and is to date 8 per cent complete, the project will cost approximately \$139,000.

Polk

Construction in this county consists of the grading, drainage and surfacing with penetration macadam six miles of road, on route No. 19, from Columbus to the South Carolina line via Tryon, at an approximate cost of \$163,994.

Rutherford

Construction in this county includes three Federal Aid Projects and four State Projects as follows:

Federal Aid Project No. 77, 2.19 miles of concrete road through the town of Rutherfordton, was completed in September, 1921, at an approximate cost of \$90,342.

Federal Aid Project No. 78-A extends from the Cleveland-Rutherford County line to Forest City, a distance of 10.2 miles. This project is of the gravel type, was completed in July, 1921, and cost \$81,674.

Federal Aid Project No. 78-B extends from Forest City to the beginning of State Project No. 877, with the exception of the town of Rutherfordton. The project which was completed in July, 1921, is of the sand-gravel type and cost \$65,602 for the 10.25 miles included in the project.

Project No. 875 includes the construction of an underpass over the C. C. & O. R. R. at Forest City. This project cost in round figures \$1,889, a portion of which will be paid by the railroad.

Project No. 877 is located between the end of Federal Aid Project No. 78-B and the beginning of State Project No. 878, a distance of 9.87 miles on route No. 20. This project is also of the top-soil type and will cost \$58,694.

Project No. 878 forms a final link in route No. 20 through Rutherford County. This project extends from the west end of Project No. 877 to the Henderson County line, a distance of 6.39 miles. It is of the gravel type and will cost, when completed, \$40,894.

Project No. 880 consists of the construction of a bridge over Second Broad River on Federal Aid Project No. 78-A. This bridge will cost, when completed, \$22,526.

Yancey

During the period covered by this report there has been only one project completed or placed under construction in the above county, this being Federal Aid Project No. 96, which extends from the Mitchell County line west to the South Toe River, a distance of 2.95 miles. The project which is of the gravel type was completed in February, 1922, and including a bridge over the South Toe River cost \$112,914.

MAINTENANCE

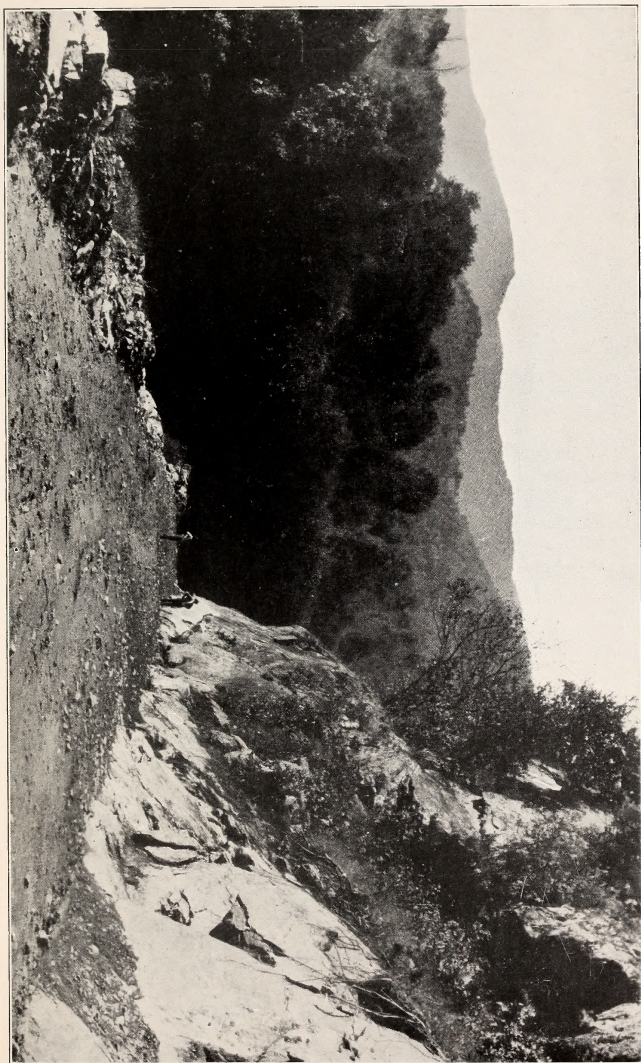
There are in this district 565 miles of the State Highway system, of which there are at the present time 505 miles under maintenance. The difference of 60 miles is composed of construction projects and a small mileage of unimproved road which is in such condition as to render maintenance im-

possible. On most projects taken over from State construction only maintenance has been necessary but in the case of county roads a large amount of reconstruction was necessary before economical maintenance could be affected as the majority of these roads had been neglected and were found to be an unusually poor condition. Particular attention was paid to the drainage of roads, to grades, widths, and finally to surfacing. The drainage of roads in this district is of prime importance as practically all of these roads are located in mountainous sections and drainage structures are required at times to carry an unusual amount of water. In the nine counties making up the district there are sixty-five steel bridges having a span of 20 feet or more; all of these structures were badly in need of paint when taken over and practically all needed reflooring. A large number of culverts have been built and a number of pipe culverts placed.

Considerable reconstruction has been done in this district by two floating gangs equipped with ten-ton tractors and large road machines, all of which are kept constantly at grading, widening and ditching the roads. As an example of this work a stretch of eight miles of road in Burke County has been completely rebuilt, all of which is on new location. A large part of route No. 19 between Woodland and Tryon has been improved by these gangs, while other work done includes clearing, grubbing, ditching, super-elevating curves, and in some instances surfacing. Throughout the district a total of 70 miles has been completely reconstructed.

In addition to special work, which has been done by maintenance forces, the routine work incidental to keeping the system of roads in first-class condition includes dragging the roads at regular intervals, keeping the brush cut back, placing danger signs, direction signs and the standard route markers.

HEAVY CONSTRUCTION ON PROJECT NO. 950—JACKSON COUNTY



NINTH DISTRICT CONSTRUCTION

The district is composed of the following counties: Buncombe, Cherokee, Clay, Graham, Haywood, Jackson, Macon, Madison, Swain and Transylvania. This district is in charge of Wythe M. Peyton, district engineer, with headquarters in Asheville. Construction work is in charge of J. C. Walker, construction engineer, maintenance work being in charge of P. L. Threlkeld, maintenance engineer.

Buncombe

Federal Aid Project No. 45 consists of the grading, drainage and surfacing with asphaltic-concrete of 7.79 miles on route No. 10, between Azalia and Black Mountain. This road was completed in July, 1921, at a cost of approximately \$350,000. This figure including several large reinforced concrete structures over the Swannanoa River, approximately 50 per cent of the cost of construction was paid from Federal Aid funds under the Act of 1916.

Federal Aid Project No. 62 forms another link in route No. 10 extending from Black Mountain to the McDowell County line, a distance of 3.44 miles. The roadway is surfaced for a width of 18 feet with penetration macadam, construction having been completed in January, 1922, at a cost of \$136,844.

Federal Aid Project No. 63 likewise forms a link of route No. 10 but it is situated west of Asheville between West Asheville and Hominy, a distance of 3.76 miles. This road is also of the asphaltic-concrete type and was completed in October, 1921, at a cost of \$160,505.

Construction has been begun on State Project No. 903 located on route No. 20, between Craggy and the west Buncombe County line, a distance of 2.58 miles. This project will be of standard asphaltic-concrete construction and will cost approximately \$91,345.

Contract has been awarded and work begun on State Project No. 904 located on route No. 29, between Grace and New Bridge, a distance of 1.53 miles. Construction, which is identical with that of Project No. 903; will cost, including the surfacing, \$71,381.

Cherokee

There are two projects under construction in this county, both of which are of vast importance to the western section of North Carolina, inasmuch as they are links of the main highway leading from Atlanta into this State, and the completion of these projects will open a territory which heretofore has been almost cut off from the remainder of the State.

Project 910 extends from the Macon County line to Old Valleytown, a distance of 7.56 miles on route No. 10. Crushed gravel is being used as a surfacing and is being placed 16 feet wide on a 22-foot graded road bed. Construction, which will probably be completed in the fall of 1922, will cost approximately \$108,219.

Project No. 911 extends from Murphy to the Georgia State line, a distance of 10.32 miles. At the present time the contract has only been let for the grading and the construction of drainage structures on this project but it is proposed at an early date to award the contract for a surfacing of waterbound macadam or of some similar construction. The cost of grading this project and the construction of the necessary drainage structures is estimated to be \$131,810.

Clay

Projects No. 920 and No. 921, both of which are under construction, constitute a link of route No. 109 which leads into North Carolina from Georgia, and when completed will open up the territory between Murphy and Hayesville and the northern section of Georgia. Project No. 920 is located between Hayesville and the Georgia State line, a distance of 5.01 miles and will cost approximately \$46,107 for the grading and surfacing with gravel.

Project No. 921 completes the link through Clay County, extending from Hayesville westward to the Cherokee County line 12.38 miles. This road is similar in construction to Project No. 920 except that top soil is being used for surfacing where gravel is not available. Work on this project, which will cost in round figures \$96,557, should be completed by January, 1923.

Graham

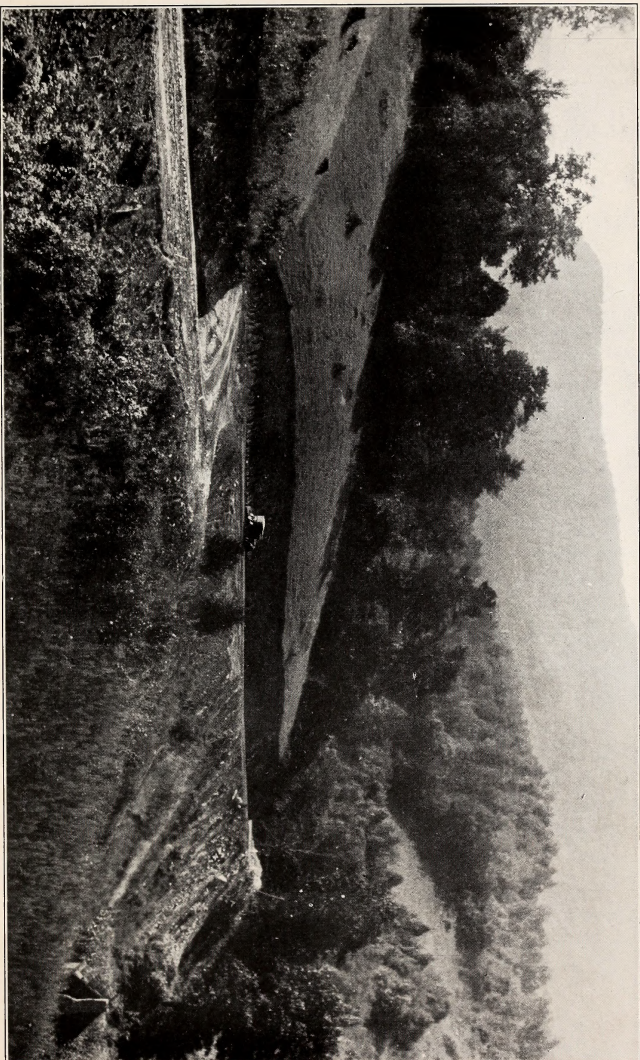
Project No. 930, construction on which was begun in October, 1921, will, when completed, form one of the most beautiful highways from a scenic standpoint in the mountainous section of the State. This project is located between the Macon County line at Topton and Robbinsville, a distance of 12.92 miles and will afford the only real outlet that Robbinsville has had to western part of North Carolina. A roadway will be surfaced with gravel for a width of 12 feet and the entire construction will cost approximately \$136,662. An idea of the character of the county in which this project is located may be gained from the fact that fifty-three thousand yards of solid rock will be moved in the construction of this road.

Haywood

Federal Aid Project No. 16 was one of the first projects which was placed under construction by the first highway commission that was appointed in North Carolina, construction having been started in March, 1918, but for various reasons has not yet been entirely completed. This project is located on route No. 10, between the Buncombe County line and the city limits of Waynesville, a distance of 14.29 miles. The roadway is being surfaced with gravel and shale for a width of 16 feet and when completed will cost approximately \$58,823.

Federal Aid Project No. 66 extends from the west city limits of Waynesville to the Jackson County line, on route No. 10. This project is likewise surfaced with gravel throughout its entire length of 6.17 miles and will cost \$94,305. Construction was completed in April, 1922.

State Project No. 940 consists of 7.13 miles, on route No. 284, between Waynesville and bridge over the Pigeon River. Work of grading and surfacing with waterbound macadam and two-course gravel was begun in April, 1922. The project is estimated to cost \$93,521.



PROJECT NO. 70-A—JACKSON COUNTY

Project No. 942 covers the construction of .57 of a mile of gravel roadway between the town of Waynesville and the beginning of Federal Aid Project No. 66. Work was completed in February, 1922, at a cost of \$5,566.

Project No. 943 consists of the reconstruction of route No. 209, between Lake Junaluska and Vines Creek, a distance of 6 miles. This is one of the mountain roads that was in such condition that it was not economical to maintain same without first reconstructing the road bed and surfacing same with gravel. The work is being handled by force account and will cost approximately \$15,000.

Jackson

Federal Aid Project No. 70-A, beginning at the Haywood County line and extending 4.81 miles on route No. 10 to Halls Siding, should be completed in the fall of the present year, construction having been begun in June, 1920. Crushed gravel is being used as a surfacing material and the project will cost including structures approximately \$187,770.

State Project No. 950 begins at Halls Siding, end of Federal Aid Project No. 70-A, and extends to Sylva, a distance of 7.55 miles. This road will likewise be surfaced with gravel and will cost, when completed, \$135,157.

Project No. 951 is located between Dillsboro and the Swain County line, a distance of 11.85 miles and will be surfaced with waterbound macadam. The cost of construction is estimated to be \$226,860.

Contract has been let for Project No. 953 located between Dillsboro and the Macon County line on route No. 285. The contract calls for the construction of a plain graded roadway which is estimated to cost \$107,442.

Project No. 954 covers the construction of 1.94 miles of reinforced concrete roadway between the towns of Sylva and Dillsboro. The estimated cost of construction is \$82,611.

Macon

Project No. 960, No. 961 and No. 962 constitute route No. 286 through Macon County.

Project No. 960 begins at the Swain County line and extends to Etna, a distance of 4.96 miles. The roadway will be surfaced with shale, top soil and gravel and will cost approximately \$66,199.

Project No. 961 extends from Etna to the Franklin township line, a distance of 4.77 miles. The construction of this project is similar to that of Project No. 960 and work will cost approximately \$53,263.

Project No. 962 extends from Franklin to the Georgia State line, a distance of 13.58 miles. This road will be surfaced with waterbound macadam and shale at a cost of approximately \$146,716.

Madison

Construction was completed in November, 1921, on Federal Aid Project No. 107 located between Walnut Gap and Laurel River Bridge, on route No. 20. This project forms an important link in the highway, route No. 20, between Asheville and Hot Springs and thence into Tennessee. The road is surfaced with shale and cost \$81,068.

Project No. 970, a part of which is in Yancey County, is located between the Buncombe County line and Swiss on route No. 69, a distance of 13.79

miles. Gravel and waterbound macadam will be used in surfacing the roadway on this project and construction will cost approximately \$243,071.

Swain

The completion of Project No. 980 will open up a portion of route No. 10, which has hitherto been impassable for traffic of any kind, being in the extreme western part of the State. This project is located between Almond and the Cherokee County line, a distance of 17.89 miles. Waterbound macadam and shale will be used as surfacing material and will be placed for a width of 12 feet on a graded road bed 20 feet in width. The cost of the entire project is estimated to be \$318,341.

Transylvania

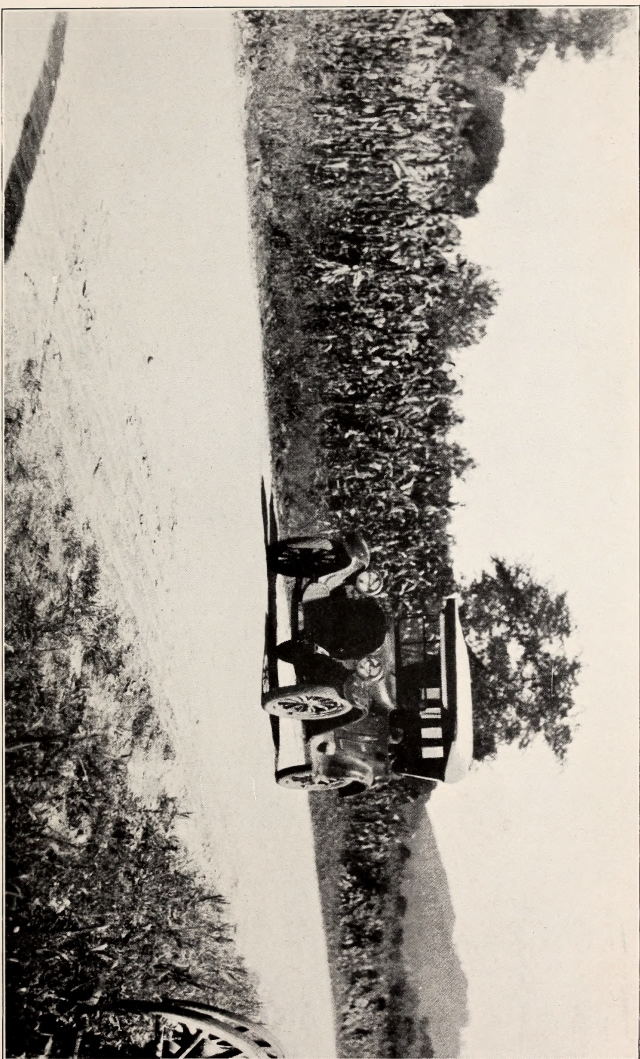
Federal Aid Project No. 69, construction of which was begun in April, 1920, consists of 9.35 miles, on route No. 28, between Henderson County line and Brevard. Waterbound macadam is being laid on this project and the total cost of construction, including several reinforced concrete bridges, will be approximately \$244,600.

State Project No. 990 covers the construction of 8.87 miles of gravel road on route No. 28 between Brevard and Rosman and will cost in round figures \$137,500.

MAINTENANCE

Of a total of 673.9 miles of the State Highway system which are located in this district, a total of 431.6 miles are under maintenance, this mileage being divided as follows: unimproved, graded and dirt roads 238.5 miles, waterbound macadam 87.1 miles, and 106 miles of top soil, sand-clay or gravel. This district, being located in the extreme western part of the State, has experienced unusual difficulty in bringing the system of roads to the high standard which exists at present. Some of these roads when taken over by the State were nothing more than trails over the mountains and were impassable for automobile traffic. Since they have been placed under maintenance by State patrol forces, however, these roads have been reshaped and new surfacing material, which was obtained locally, placed on same. In a majority of cases these roads are as good as the roads, which are under maintenance, in any section of the State. Photographs in this report show clearly the improvement that has been brought about in some of these roads. In addition to the work that has been done on these roads which have just been mentioned, considerable attention has been given toward making the highways safer for the travelling public. All bridges throughout the district have been whitewashed, telephone poles whitewashed for a height of about eight feet, standard signs placed and the bushes along the roads throughout the entire district are kept closely trimmed, thus adding not only to the safety of the highway but also to the beauty.

Some of the roads in this district were, when taken over, in such condition as to render economical maintenance impossible and for this reason are only being kept in passable condition pending such time as the construction of new roads will take place.



AN EXAMPLE OF STATE MAINTENANCE

PART IV

Auditing Department

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PART IV

Appendix D

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Auditing Department

REPORT OF AUDITOR

The activities of this Department are represented in the annual audit, the report on which constitutes, in condensed form, the report of this Department and is presented below.

HOMER PEELE, *Auditor.*

MR. FRANK PAGE, *State Highway Commissioner,*
Raleigh, North Carolina.

DEAR SIR:

We have made a complete audit of the books and records of the North Carolina State Highway Commission for the fiscal year ending June 30, 1921.

The attached Index gives a list of the Exhibits and Schedules that reflect the detail of the year's operations and the financial position of the Highway Commission at the end of the year, June 30, 1921.

The Commission operated during the year upon funds created by two laws, the first being enacted by the General Assembly session of 1919, and the other by the General Assembly session of 1921. The financial condition and the operations from the funds of each law are shown separately.

1919 LAW

Exhibits A to H, inclusive, and Schedules A-1 to A-6, inclusive, pertain to the funds created by this law.

We were informed that all contracts that were to be paid out of the State Highway Fund (Exhibit B) for road construction projects, had been let at June 30, 1921. The allotments as shown by the books for these projects were revised to agree with the latest estimated cost as shown by the records of the project engineer. If there are no further changes in the construction costs and providing the Accounts Receivable and Advances shown in Exhibit A are realized in cash, the State Highway Fund will have a surplus balance of \$218,444.83 on the completion of all contracts, which we understand will revert to the construction fund of the 1921 Law.

The Administration Fund (Exhibit C) Surplus balance of \$34,648.63, we were informed would be used to complete the garage at the truck field. The exact cost of the uncompleted part is not determinable at this time as the work is not being done under contract, but under the supervision of the Highway Commission.

Exhibit E shows the Cash Receipts and Disbursements of all funds, the receipts by sources, and the disbursements by purposes. The funds as shown herein will not agree with the Exhibits showing the operations through these funds, as the latter are kept on a revenue and expenses basis, which is necessary in order to show the funds' true condition.

1921 LAW

Exhibits I to N, inclusive, and Schedules I-A to I-2a, inclusive, pertain to this law.

As the law did not become effective until March 3, 1921, the Exhibits and Schedules above cover the period from that time to the end of the fiscal year, June 30, 1921.

The State Highway Construction Fund (Exhibit J) shows an excess of Expenditures and Charges over Revenue and Credits of \$1,195,100.70. This apparent deficit is explained by the fund being charged for all contracts entered into for road construction projects up to the end of the fiscal year, the expenditures for same to be made as the work progresses. The actual revenue received up to June 30, 1921, was \$500,000.00, which amount was borrowed by the State Treasurer to provide immediate working funds, the loan to be repaid out of the funds that will be provided from the authorized sale of \$50,000,000.00 of the State of North Carolina Highway Serial Bonds, the law authorizing that \$10,000,000.00 of these bonds may be issued in 1921.

In order that funds might be available to meet the contractual obligations of the Commission, the following resolution by the Council of the State was passed:

EXECUTIVE OFFICE, RALEIGH, N. C.,

May 17, 1921.

The Governor and Council of State met in the Governor's Office, Tuesday, May 17, 1921, and passed the following resolution:

Resolved: That the State Highway Commission be notified to proceed with the construction of roads in the State, giving the Treasurer notice of each contract made and as intelligent an estimate as can be given of the monthly requirements in money to meet the obligations of the Commission; that they shall not, without further directions from the Council of State, exceed the expenditures of ten millions (\$10,000,000.00) of dollars for the twelve months beginning the first day of June.

Notice of this resolution shall issue to the State Highway Commission.

(Signed) CAMERON MORRISON,
Governor.

(Signed) J. BRYAN GRIMES,
Secretary of State.

(Signed) BAXTER DURHAM,
State Auditor.

(Signed) B. R. LACY,
State Treasurer.
Superintendent of Public Instruction.

Approved:

JAMES S. MANNING, (Signed)
Attorney-General.

It will be seen from the resolution that revenue is promised that will provide funds for commitments that have been made by the commission and future commitments for the fiscal year not exceeding \$10,000,000.00.

ACCOUNTING SYSTEM

The enactment of the new law on March 3, 1921, required a new system of accounts, which was devised by your auditor. We have gone over same and find that it was laid out on proper accounting lines, to show the correct financial position and operating fund results, as well as the cost of road maintenance by construction types. The latter information should prove of great value.

The books of account were accurately and properly kept during the year under review.

Respectfully submitted,

PULLEN, HENDERSON & COMPANY,
By A. M. Pullen.

August 19, 1921.

TO THE HONORABLE FRANK PAGE, *Chairman*,
and

*The Honorable Commissioners of the North Carolina State
Highway Commission,
Raleigh, North Carolina.*

GENTLEMEN:

As directed by the Auditor of the State, the Honorable Baxter Durham, under Chapter 2 of the Public Laws of 1921, we have made a complete Audit of the books and accounts of the North Carolina State Highway Commission, for the fiscal year beginning July 1, 1921, and ending June 30, 1922.

The Commission continues to operate on funds acquired under Chapter 189, of the Public Laws of 1919, completing projects and undertakings begun prior to the passage of Chapter 2 of 1921. The accounts under each Act are presented separately and designated (1919 Law) or (1921 Law) as the case may be.

The results of the Audit are reported in thirteen Exhibits and six Schedules, two pages of Comments under the 1919 Law and four pages of Comments under the 1921 Law, all as listed in the Contents attached.

Some exceptions may be taken to the method of keeping the Accounts under the 1919 Law, in so far as Projects are not kept on an actual basis. This objection is developed more fully in the Comments and the Accounts presented. It seems the accounts were started in the manner objected to and as they will be wound up shortly, it was thought expedient to continue in the same way. Our presentation shows the accounts as shown by the books and also, as near as it is possible to show, the actual status. Otherwise, the accounts are well kept and in proper order.

The accounts under the 1921 Law are well kept and the system in use is well designed, provides proper safeguards, affords ample information and shows properly and in good order, results and position. The Accounting Department is well organized and the Staff interested, enthusiastic and loyal.

Respectfully submitted,

S. G. GARDNER & COMPANY,
By S. G. Gardner, C. P. A.

August 31, 1922.

EXHIBITS A AND AA—FUND BALANCE SHEET

The Accounts are kept as to Funds and proprietary accounts are carried only as they represent Fund Assets and Liabilities. Allotments to Construction Projects is an encumbrance to State Highway Fund and at the same time reflects the net liability to Projects.

Exhibit A sets out Fund Assets and Liabilities as shown by the books. Exhibit AA sets out the actual status as near as can be determined. The difference in Advances on Exhibit A and Participation Balances on Exhibit AA in Assets and on Allotments to Construction Projects in Liabilities. Advances represent payments made out of Commission Funds on Federal Aid projects and in anticipation of Federal and County Funds. Federal and County payments are credited on the books only as received. To state the actual status, Advances are eliminated and Federal and County liability set up as due and as an Asset of the Commission.

Accounts Receivable. This represents debit balances to Counties for Truck hire, supplies and materials advanced for County maintenance and on the whole is doubtful. It is thought about one-third to one-half the total of \$101,623.11 will be collected.

EXHIBITS B AND C—FUND REVENUE AND EXPENDITURES

Operations are accounted for on an actual basis and reflected in Revenue and Expenditure as stated in these two Exhibits. Administration Fund is now closed into State Highway Fund.

EXHIBITS D AND E—CONSTRUCTION PROJECTS

Part one of Exhibit D shows the Credits and Charges to Construction Projects in aggregate for the fiscal year, as taken from the books. Part two makes adjustments to the result as found in part one to show the actual status. Exhibit E is a detail of and shows each Project in its balance at the beginning of the year, the transactions effecting and the closing balance.

Federal Aid and County Funds are credited to Projects only as payments are made; meantime Commission Funds expended in excess of Commission participation are charged to the Project, credited back to the Project and charged to Advances. However, all such disbursements are not so credited, the result being the Project shows a book overdraft, this instead a debit to Advances. Only disbursements of Commission Funds actually credited back and charged to Advances on the books are considered in the statement.

Exhibit E in the starting balances and overdrafts, the transactions for the year and the balances and overdrafts at June 30th, is taken from the books. From this point are added the estimated liability of the U. S. on Federal Aid and the estimated liability of the County; then is deducted the amount credited to Projects as a Commission Advance; the result being the actual credit balance or overdraft on each Project. The aggregate of this treatment is reflected in Exhibit D and also through Exhibit D into the adjusted Fund Balance Sheet, Exhibit AA.

FEDERAL AID SURVEY FUND (EXHIBITS A AND AA)

No transactions appeared against this Fund for the year. Its function was to disburse Federal Aid to the Counties for Surveys. The net balance

is \$813.03 and its composition indicates there is due Counties \$5,643.83, and due from Counties \$4,830.80. Both debits and credits appear to be adjustments and it is likely that no further transaction will be had on this fund.

STATE HIGHWAY FUNDS (1921 LAW) (EXHIBITS A AND AA)

Maintenance Fund (1921) has advanced \$625,000.00 and Construction Fund (1921) \$189,310.88. Total, \$814,310.88 to State Highway Fund (1919).

EXHIBIT F—FUND BALANCE SHEET

The accounts are kept as to Funds and only Fund Assets and Liabilities are carried in the Books. Allotments to Construction Projects is an encumbrance to Construction Fund and also a liability for the contracts and estimated costs of the Projects, on which allotments have been made.

EXHIBITS G, H, I, J—FUND REVENUE AND EXPENDITURES

Operations are accounted for on an accrual basis and reflected in Revenue and Expenditures of Funds. G and H state maintenance and Administration; I, State Highway Construction Fund and J, Federal Aid Construction Fund.

EXHIBITS K AND L—CONSTRUCTION PROJECTS

Exhibit K states in aggregate the credits and charges to Construction Projects for the year; it also states the balance credit, overdraft and net at June 30th. Exhibit L details the information as a whole as to each Project.

CONSTRUCTION FUND (EXHIBIT F)

The net credit balance stated in Exhibit F, \$2,081,752.59, includes Federal Aid and encumbrances represented in Construction Projects.

State Highway Construction Fund is in deficit \$17,299,286.21, due to anticipation of Revenue in making Construction Projects allotments. The commission program based on the \$50,000,000 bonds authorized in Chapter 2 of the Public Laws of 1921 would be reflected at this time as follows:

STATE HIGHWAY CONSTRUCTION FUND

Bonds authorized	\$50,000,000.00
Available (State Treasurer)	6,545,775.00
	<hr/>
Balance	\$43,454,225.00
	<hr/>
Deficit (Exhibit I)	17,229,286.21
Surplus, Unencumbered	26,154,938.79
To which add Federal Aid (Exhibit J)	875,693.90
	<hr/>
Total Surplus, Unencumbered.....	\$27,030,632.69

The Federal Aid Fund is based on the apportionment of the Bureau of Public Roads, U. S. Department of Agriculture, to the State—\$1,709,333.90 out of a Congressional Appropriation of \$75,000,000.00, for the fiscal year 1922. See Exhibit J.

ASSETS (EXHIBIT F)

Advances to Contractors are secured by liability on contracts. Deductions are made from estimates to liquidate.

Due by U. S. on approved Projects \$15,325.93. This item is a balance due by the Bureau of Public Roads on projects it approved and will be paid in due course.

State Highway Fund (1919 Law). Advances have been made as stated to enable "State Highway Fund (1919)" to carry on pending collections of U. S., and County Funds on Federal Aid Projects.

Working Funds are in the hands of District Engineers and other employees for the purpose of expediting Construction and Maintenance. All employees handling Working Funds are bonded.

Advances have been made to Lenoir County pending the adjustment and settlement of certain contracts between the County and the Commission.

Maintenance Material is inventoried at Book Value, \$28,589.42, and will be charged out as used, to District Maintenance.

DEFERRED CREDITS (EXHIBIT F)

Various Counties agreed with the Commission to advance funds to hasten construction of Commission Projects. Allotments will be made in due time to cover the Projects and reimburse the Counties. Pending this action, the debits are being carried against the Projects affected.

FEDERAL AID

Federal Aid for the fiscal year 1922 is noted under Construction Fund in these Comments and in Exhibit J.

Federal Aid not taken into account will be available as follows:

Apportioned out of Congressional appropriations by the Bureau of Public Roads, U. S. Department of Agriculture:

<i>Fiscal Year</i>	<i>Appropriation</i>	<i>Apportionment</i>
1923	\$50,000,000.00	\$1,139,556.00
1924	65,000,000.00	1,481,075.00
1925	75,000,000.00	1,709,334.00

BOND SALES

Up to June 30, 1922, the State Treasurer sold State Highway Serial Bonds to the value of \$10,552,600.00—\$4,552,600.00 at 5% and \$6,000,000.00 at 4½%. Of this value, \$6,545,775.00 was made available to the Highway Commission:

Credited to Checking Account in the Current Year.....\$6,045,775.00

Paid amount borrowed Previous Year..... 500,000.00

leaving a discrepancy of \$4,006,825.00. The State Treasurer exacted, and the Commission paid, interest on the total amount sold at the semi-annual period, July 1, 1922.

The interest on the amount not made available should accrue to the Highway Commission or alternatively the State Treasurer should pay the interest on the same amount, and only exact from the Commission interest on amounts made available.

This was discussed with Chairman Page, who is to take it up with the State Treasurer.

RECONCILEMENTS WITH STATE TREASURER

The State Treasurer carries the available Cash of the Commission in two accounts: Construction Fund and Maintenance Fund. Proceeds of Bond Sales in the first and returns of the Secretary of State on Automobile Licenses and Gasoline Taxes in the second.

The Treasurer's Accounts are important sources of information and checks to the Accounting Department of the Commission, but their value has been lost for the year under review on account of inaccuracies in the Treasurer's Office.

Instead of reconciling its own accounts with those of the Treasurer, through the past year the practice was mostly to reconcile the accounts of the Treasurer's Office with those of the Commission.

A definite arrangement between the Treasurer's Office and the Commission as to formal notices for credits by the Treasurer would probably obviate the difficulty.

SURETY BONDS

The Chairman is bonded for \$10,000.00 and the Commissioners for \$5,000.00, each. The Bonds are personal and signed by Commissioners, one for the other. The form was approved by the Attorney-General.

The Commission fixed the bond of the Highway Engineer at \$10,000.00, but through oversight it was not accomplished. Application for the bond was made August 23, 1922.

In the Accounting Department, the Auditor is bonded for \$10,000.00, and two Assistants at \$5,000.00, each.

Engineers and employees handling Working Funds or advances are bonded in proper sums—\$100.00, up to \$5,000.00.

Chairman Page has issued instructions to increase the Bond protection, by adding the Purchasing Agent, the Assistant Highway Engineer and the Superintendent of the Truck Field, to the list.

APPORTIONMENT

Apportionments to Districts under Chapter 2 of 1921* have been made for the entire program of the State Highway Commission and will be reflected in the allotments to Construction Projects when completed.

Federal Aid for the fiscal year 1922 has been likewise apportioned.

Allotments to Construction Projects are made when contracts are let and are for the amount of contract and ten per cent added for Engineering and Contingencies. Allotments are charged to and encumber the Fund from which made—State Highway Construction or Federal Aid Construction.

EXHIBIT "A"

BALANCE SHEET (1919 LAW) AS OF JUNE 30, 1921

ASSETS

<i>Available Cash (Available for Funds Indicated), (Schedules "A-1-6", Inc.):</i>		
State Treasurer—State Highway Fund	\$137,756.57	
State Treasurer—Administration Fund	33,388.56	
Outside Banks—Federal Aid Cons. Fund	272,638.17	
Merchants National Bank—Federal Aid Cons. Fund	261,575.58	
Merchants National Bank—(S. H. Fund)	6,282.03	
Raleigh Bank and Trust Co.—(S. H. Fund)	58,016.72	
Citizens National Bank—Federal Aid Survey Fund	1,059.18	\$770,716.81
<i>Accounts Receivable:</i>		
Individuals and Counties for Truck Hire, T. N. T. Powder, etc.		58,456.69
<i>Advances:</i>		
<i>For Construction Projects:—To various projects out of State Funds in excess of States' allotments, in order to carry on construction until Federal and Local Funds are received</i>		
	599,323.18	
<i>To Contractors on Road Projects for Cement. Deductions are made from Contractor's estimate to reimburse</i>	78,404.20	
<i>To Employees for temporary Working Fund (Surety Bonds securing)</i>	11,685.73	689,413.11
		<u>\$1,518,586.61</u>

LIABILITIES

<i>Construction Projects—(Exhibit "H")</i>		\$1,264,680.12
<i>Net Credit Balance due projects under construction after placing to each, State Highways Fund allotments to extent of participation, also advances from same Fund and also crediting all Federal and County money yet received: and charging all of the above amounts spent for construction.</i>		
<i>*Fund Revenue Account Balances:</i>		
State Highway Fund—Revenue received and earned in excess of expenditures and allotments—(Exhibit "B")	\$218,444.83	
Administration Fund—Excess of Revenue over Expenditures—(Exhibit "C")	34,648.63	
Federal Aid Survey Fund—(Due Counties)	813.03	253,906.49
		<u>\$1,518,586.61</u>

*These funds include previous year's balances.

EXHIBIT "B"

STATE HIGHWAY FUND OPERATING ACCOUNT (1919 LAW)
For Year ending June 30, 1921

EXPENDITURES AND CHARGES

<i>Allotments to Construction Projects:</i>		
Credits passed to Construction Projects for the amount of State's participation in sundry project contracts, to be expended as work progresses		\$1,118,409.74
<i>Maintenance:</i>		
Expenditures in conformity with legal requirements for State's proportion		147,740.04
<i>Preliminary Surveys—(Also see Administration Fund)</i>		68,690.61
<i>General Inspection</i>		131.02
<i>T. N. T. Powder (Donated by U. S. Government):</i>		
Cartridging	\$20,701.00	
Freight and Express	768.00	
Labor	640.90	
Storing	1,137.48	
Miscellaneous	512.97	
<i>Cost of Transfer from Government Warehouses:</i>		\$23,760.35
<i>Note:—The Inventory at 6-30-21 was not taken. See detail other side of \$14,167.42.</i>		
<i>Automobiles and Trucks:</i>		
Pay Roll	19,483.40	
Supplies and Repairs	53,591.38	
Gas and Oil	8,836.18	
Freight and Express	26,431.27	
Rent Truck Field	350.00	
Buildings at Truck Field	1,370.47	
Miscellaneous	1,069.12	
<i>Total expenditures for costs incident to Auto and Trucks</i>		111,131.82
<i>Note:—See other side for Revenue derived of \$85,805.05.</i>		
<i>Equipment</i>		28,222.74
		1,498,086.32

REVENUE AND CREDITS

<i>Auto License Revenue:</i>		
Received by the Secretary of State and turned over to the State Treasurer to the credit of this Fund		\$1,236,393.47
<i>Other Revenue—viz:</i>		
Interest on Daily Balances on Bank Accounts	\$ 2,947.49	
Sale of T. N. T. Powder (See other side for costs)		
<i>Revenue from Trucks:</i>		
Rentals	\$72,305.36	
Sales of Parts	12,849.69	
Ford Car Sales	650.00	85,805.05
Sale of Plans, etc.	2,762.40	
Discounts earned on cement purchased for contractors	5,848.48	111,530.84
<i>Balance—Excess expenditures and charges over revenue and credits (brought down)</i>		150,162.01
		1,498,086.32
<i>Balance Revenue, June 30, 1920</i>		368,606.84
<i>Less: Balance for Current year as above</i>		150,162.01
<i>Total excess revenue—(to exhibit "A")</i>		218,444.83

EXHIBIT "C"

ADMINISTRATION FUND OPERATING ACCOUNT (1919 LAW)

For Year ending June 30, 1921

EXPENDITURES AND CHARGES

<i>Preliminary Surveys</i> —Office Draftsmen's salaries paid from Administration and prorated to various surveys		\$20,728.74
<i>Office Salaries</i>		45,803.24
<i>Commissioners:</i>		
Salary of Chairman and per diem of other members	\$7,275.01	
Traveling Expenses	4,612.15	11,887.16
<i>General Office Expense</i>		28,026.67
<i>Trucks:</i>		
Supplies and Repairs	\$1,554.11	
Miscellaneous	122.55	1,676.66
<i>State Highway Bulletin:</i>		
Expenses of Printing, etc.	\$3,440.85	
Less: Revenue Received.....	520.07	2,920.78
<i>Annual Reports</i>		2,539.53
<i>Fixed Properties:</i>		
Equipment.....	\$10,309.61	
Garage Building.....	60,865.78	
Office Furniture and Fixtures.....	3,804.62	
*Office Building.....	115.75	75,095.76
		\$188,678.54

REVENUE AND CREDITS

<i>Auto License Revenue</i> —Prorata of Auto License Receipts turned over by the Secretary of State to State Treasurer for Administration Fund		\$138,746.53
<i>Balance—Excess Expenditures and Charges Over Revenue and Credits</i> (brought down)		49,932.01
		\$188,678.54
<i>Balance Revenue—June 30, 1920</i>		\$84,580.64
<i>Less: Balance for Current Year as above</i>		49,932.01
<i>Total Excess Revenue Over Expense (to Exhibit "A")</i>		\$34,648.63

EXHIBIT "D"

For Year ending June 30, 1921

RURAL ENGINEERING FUND—OPERATING ACCOUNT

<i>Balance—June 30, 1921</i>	\$4,140.07
<i>Expenditures</i> —Sundry Expenses—Incurred by P. H. Daggett, Chapel Hill, N. C., conducting Rural Engineering work. Paid upon detailed vouchers submitted by him.....	4,140.07
<i>Fund Exhausted—June 30, 1921.</i>	

EXHIBIT "E"
CASH RECEIPTS AND DISBURSEMENTS—ALL FUNDS (1919 LAW)
 For Year ending June 30, 1921

Receipts	State Highway Fund	Administration Fund	Federal Aid Const. Fund	Appropriation Fund	Rural Eng. Fund	Federal Aid Survey Fund	Sundry S. H. Revenue Account	Total
Auto License Taxes	\$1,236,393.47	\$138,746.53						\$1,375,140.00
Advances and Accounts Paid	375,000.00						\$684,820.35	1,059,820.35
Reversions	195,347.92	742.15	\$254.00					196,344.07
Interest on Daily Balances			1,889.14				1,058.35	2,947.49
County and Local Funds			2,218,927.04			\$834.70		2,219,761.74
U. S. Dept. Agricultural Funds			2,862,380.92					2,862,380.92
Highway Bulletin Advertising							523.19	523.19
Truck Rent							9,220.66	9,220.66
Sale of T. N. T. Powder							3,829.02	3,829.02
Sale of Plans							610.86	610.86
Sale of Auto Parts							20,226.36	20,226.36
Sundry Sales							2,051.38	2,051.38
<i>Receipts for Year</i>	\$1,806,741.39	\$139,488.68	\$5,083,451.10			\$834.70	\$722,340.17	\$7,752,856.04
<i>Balances—July 1, 1920</i>	467,542.62	83,780.64	143,865.04	\$21.02	\$4,140.07	224.48	11,958.58	711,532.45
<i>Total Receipts</i>	\$2,274,284.01	\$223,269.32	\$5,227,316.14	\$21.02	\$4,140.07	\$1,059.18	\$734,298.75	\$8,464,388.49

EXHIBIT "F"—Continued
CASH RECEIPTS AND DISBURSEMENTS—ALL FUNDS (1919 LAW)
 For Year ending June 30, 1921

DISBURSEMENTS	State Highway Fund	Administra- tion Fund	Federal Aid Const. Fund	Appro- priation Fund	Rural Eng. Fund	Federal Aid Survey Fund	Sundry S.H. Revenue Account	Total
Construction on Projects.....	\$1,787,453.35		\$4,143,845.01					\$5,931,298.36
Maintenance.....	104,632.21							104,632.21
Preliminary Surveys.....	68,550.61	\$20,728.74						89,279.35
Expenses incident to Trucks, Autos and T. N. T. Powder.....	133,396.03	1,705.74						135,101.77
Advances (to be repaid).....	13,710.78	682.15						14,392.93
Equipment and Buildings.....	27,323.37	10,425.36						37,748.73
General Inspection.....	64.47							64.47
Reversions.....	1,396.62	14.00	549,257.38				\$670,000.00	1,220,668.00
Garage.....		60,865.78						60,865.78
Office Furniture and Fixtures.....		3,804.62						3,804.62
Annual Report.....		2,539.53						2,539.53
Highway Bulletin.....		3,440.85						3,440.85
Official Salaries.....		7,275.01						7,275.01
Office Salaries.....		45,330.49						45,330.49
Official Per Diem and Traveling Expenses.....		4,330.33						4,330.33
General Office Expense.....				\$21.02				28,759.18
Rural Engineering Expense.....		28,738.16			\$4,140.07			4,140.07
<i>Total Disbursements.....</i>	<i>\$2,136,527.44</i>	<i>\$189,880.76</i>	<i>\$4,693,102.39</i>	<i>\$21.02</i>	<i>\$4,140.07</i>		<i>\$670,000.00</i>	<i>\$7,693,671.68</i>
<i>Balances—June 30, 1921.....</i>	<i>\$137,756.57</i>	<i>\$33,388.56</i>	<i>\$534,213.75</i>			<i>\$1,059.18</i>	<i>\$64,298.75</i>	<i>\$770,716.81</i>

EXHIBIT "I"

BALANCE SHEET (1919 LAW) AS OF JUNE 30, 1921

ASSETS

<i>Available Cash (Available for Funds Indicated), (Schedules "I-1"— .. "I-2"):</i>	\$359,741.78	
State Treasurer—State Highway Construction Fund.....	150,321.13	\$510,062.91
State Treasurer—State Highway Maintenance Fund.....		
<i>Advances—To Employees as Working Fund (protected by Surety Bonds).....</i>		60,550.00
<i>Due by U. S. Government—For participation in projects approved by them, payments to be made as work progresses</i>		66,612.99
<i>Inventory of Materials—To be used for Road Maintenance</i>		2,548.63
<i>Fund Revenue Account Balances—State Highway Construction Fund Excess Expenditures and Charges over Revenue and Credits (Ex. "J"), (see Comments).....</i>	\$1,195,100.70	
<i>Less: State Highway Maintenance Fund, Excess Revenue and Credits over Expenditures and Charges (Ex. "K")</i>	157,369.76	1,037,730.94
		\$1,677,505.47

LIABILITIES

<i>Construction Projects (Exhibit "N")—Net Credit balance due projects under construction, after placing to each the State's and Government's portion of contract, and charging each project with the amounts expended thereon</i>	\$1,627,005.47
<i>Notes Payable—1 Note dated May 3, 1921—Due Sept. 3, 1921, Int. 6%.....</i>	50,000.00
<i>Accrued Interest on Above Note.....</i>	500.00
	\$1,677,505.47

EXHIBIT "J"

STATE HIGHWAY CONSTRUCTION FUND OPERATING ACCOUNT (1921 LAW)

March 4, 1921 to June 30, 1921

EXPENDITURES AND CHARGES

<i>Allotments to Construction Projects</i> —Credits passed to Construction Projects for the amount of State's participation in sundry project contracts, to be expended as work progresses.....		\$1,590,826.79
<i>Testing Materials</i>		210.08
<i>General Survey</i> (Cost of surveying roads to be taken over under this law).....		10,926.70
<i>General Office Expenses</i>		1,245.11
<i>Equipment Expense</i>		4,575.82
<i>Truck and Auto:</i>		
Salaries.....	\$8,052.98	
Supplies and Repairs.....	16,622.16	
Gas and Oil.....	2,420.92	
Freight and Eexpress.....	1,867.13	
Sundries.....	387.41	29,350.60
<i>Fixed Properties:</i>		
Equipment.....	\$28,674.91	
Technical Instruments.....	2,970.00	
Furniture and Fixtures.....	4,145.55	
Office Building (partly completed).....	22,332.99	58,123.45
		<u>\$1,695,258.55</u>

REVENUE AND CREDITS

Borrowed by State Treasurer in anticipation of the sale of \$50,000,000.00 State of North Carolina Highway Serial Bonds, authorized by State Road Law, enacted by General Assembly in session, 1921.....	\$500,090.00
Interest received on deposits.....	157.85
	<u>\$500,157.85</u>
<i>Balance</i> —Excess Expenditures and Charges over Revenue and Credits (to Exp. "I")....	1,195,100.70
	<u>\$1,695,258.55</u>

EXHIBIT "K"

STATE HIGHWAY MAINTENANCE AND ADMINISTRATION FUND OPERATING
ACCOUNT (1921 LAW)

March 4, 1921 to June 30, 1921

EXPENDITURES AND CHARGES

<i>Administrative:</i>		
Salaries and Expenses of members of State Highway Commission.	\$6,509 79	
Office Salaries.....	23,115 24	
Office Expense.....	5,546 34	
Office Supplies.....	3,844 46	
Technical Supplies.....	2,182 86	
Sundries.....	123 43	
Preliminary Surveys	1,408 25	
Traveling and Incidentals	2,209 16	
Highway Bulletin (Printing, etc.).....	695 78	
Interest on Loan (unpaid).....	500 00	
Furniture and Fixtures.....	3,896 40	\$50,031.71
District (Exhibit "M").....	\$7,287 80	
General	803 29	8,091.09
<i>Total</i>		\$58,122.80
<i>Balance</i> —Excess Revenue and Credits over Expenditures and Charged to (Exh. "I").....		157,369.76
		\$215,492.56

REVENUE AND CREDITS

<i>Revenue from Auto License and Gasoline Tax</i> —Received by Secretary of State and turned over to the State Treasurer to the credit of this fund.....	\$215,492.56
	\$215,492.56

EXHIBIT "L"

CASH RECEIPTS AND DISBURSEMENTS—ALL FUNDS (1921 LAW)

March 4, 1921 to June 30, 1921

RECEIPTS			
	S. H. Construction Fund	S. H. Maintenance Fund	Total
<i>Borrowed by State Treasurer—In anticipation of the sale of \$50,000,000.00 State of North Carolina, Highway Serial Bonds, authorized by State Road Law enacted by General Assembly in session 1921.....</i>	\$500,000.00	-----	\$500,000.00
<i>Interest Received on Deposits.....</i>	157.85	-----	157.85
<i>Auto License and Gasoline Tax.....</i>	-----	\$215,492.56	215,492.56
<i>Borrowed by State Treasurer—To begin Maintenance Operations in anticipation of revenue from Auto License and Gasoline Tax.....</i>	-----	50,000.00	50,000.00
	\$500,157.85	\$265,492.56	\$765,650.41
DISBURSEMENTS			
	S. H. Construction Fund	S. H. Maintenance Fund	Total
<i>Construction Projects.....</i>	\$30,434.31	-----	\$30,434.31
<i>General Survey.....</i>	10,926.70	-----	10,926.70
<i>Testing Materials.....</i>	210.08	-----	210.08
<i>Equipment Expense.....</i>	4,575.82	-----	4,575.82
<i>General and Overhead.....</i>	1,245.11	-----	1,245.11
<i>Truck and Auto:</i>			
Salaries.....	\$ 8,052.98	-----	8,052.98
Supplies and Repairs.....	16,622.16	\$123.43	16,745.59
Freight and Express.....	1,867.13	-----	1,867.13
Gas and Oil.....	2,420.92	-----	2,420.92
Sundries.....	387.41	-----	387.41
<i>Fixed Property Outlay:</i>			
Equipment.....	\$28,674.91	-----	28,674.91
Technical Instruments.....	2,970.00	-----	2,970.00
Furniture and Fixtures.....	4,145.55	3,896.40	8,041.95
Office Building.....	22,332.99	-----	22,332.99
<i>Advance to Employees.....</i>	5,550.00	55,000.00	60,550.00
<i>Salaries and Expenses of Commission.....</i>	-----	6,509.79	6,509.79
<i>Office Salaries.....</i>	-----	23,115.24	23,115.24
<i>Office Expense.....</i>	-----	5,546.34	5,546.34
<i>Office Supplies.....</i>	-----	3,844.46	3,844.46
<i>Technical Supplies.....</i>	-----	2,182.86	2,182.86
<i>Highway Bulletin.....</i>	-----	695.78	695.78
<i>Preliminary Survey.....</i>	-----	1,408.25	1,408.25
<i>Traveling and Incidental.....</i>	-----	2,209.16	2,209.16
<i>General Maintenance.....</i>	-----	803.29	803.29
<i>District Maintenance.....</i>	-----	7,287.80	7,287.80
<i>Materials Purchased.....</i>	-----	2,548.63	2,548.63
<i>Total.....</i>	\$140,416.07	\$115,171.43	\$255,587.50
<i>Balances—June 30, 1921.....</i>	359,741.78	150,321.13	510,062.91
	\$500,157.85	\$265,492.56	\$765,650.41

EXHIBIT "A"

FUND BALANCE SHEET (1919 LAW) AS TAKEN FROM THE BOOKS
As of June 30, 1922

ASSETS

<i>Cash:</i> (Schedule "A-1")		
State Treasurer—State Highway Fund	\$ 6,036.44	\$
Merchants National Bank—Federal Aid	35,112.21	
Treasurer Pitt County—County Participation	31.35	
Citizens National Bank—Federal Aid Survey	1,059.18	
		42,239.18
<i>Advances:</i>		
Out of State Highway Fund for Federal Aid and County portions on Federal Aid Projects (estimated)		945,850.82
<i>Accounts Receivable—Counties:</i>		
Owe for Truck Hire, Truck Supplies and Materials (doubtful)		101,623.11
		1,089,713.11

LIABILITIES

<i>Due State Highway Funds</i> (1921 Law): (Exhibit "F")	\$	\$
Maintenance Fund	625,000.00	
Construction Fund:		
For Truck Supplies	\$ 47,876.45	
Federal Aid Advances	189,310.88	
		814,310.88
<i>Fund Balances:</i>		
Allotment to Construction Projects Exhibits "D" and "E").		
Credit Balances	\$699,122.71	
Less: Overdrafts	620,831.99	
<i>State Highway Fund</i> (Exhibit "C")	78,290.72	
<i>Federal Aid Survey Fund</i>	196,298.48	
	813.03	
		275,402.23
		\$ 1,089,713.11

EXHIBIT "AA"

FUND BALANCE SHEET (1919 LAW) ESTIMATED ACTUAL STATUS
As of June 30, 1922

ASSETS

<i>Cash:</i> (Schedule "A-1").....	\$ 6,036.44	
State Treasurer—State Highway Fund.....	6,036.44	
Merchants National Bank—Federal Aid.....	35,112.21	
Treasurer Pitt County—County Participation.....	31.35	
Citizens National Bank—Federal Aid Survey.....	1,059.18	
		42,239.18
<i>Participation Balances</i> (Estimated) (Exhibit "E")		
U. S. on Federal Aid Projects.....	673,387.22	
Counties on Federal Aid Projects.....	349,751.61	
		1,023,138.83
<i>Accounts Receivable:</i>		
Counties owe for truck hire, truck supplies and materials (doubtful).....		101,623.11
		\$ 1,167,001.12

LIABILITIES

<i>Due State Highway Fund:</i> (1921 Laws): (Exhibit "F")		
Maintenance Fund.....	\$ 625,000.00	\$-----
Construction Fund:		
For Truck Supplies.....	\$ 47,876.45	
Federal Aid Advances.....	141,434.43	
	189,310.88	814,310.88
<i>Fund Balances:</i>		
Allotment to Construction Projects: (Exhibit "D" and "E")		
Credit Balances on.....	\$495,439.87	
Less: Overdrafts on.....	339,861.14	
	155,578.73	
<i>State Highway Fund:</i> (Exhibit "C").....	196,298.48	
<i>Federal Aid Survey Fund</i>	813.03	352,690.24
		\$ 1,167,001.12

EXHIBIT "A-2"**CASH RECEIPTS, DISBURSEMENTS AND BALANCES (1919 LAW)**
For the Fiscal Year ending June 30, 1922

	Balance July 1, 1921	Receipts	Disburse- ments	Balance June 30, 1922
<i>State Highway Fund:</i>				
State Treasurer.....	\$ 137,756.57	\$ 793,631.90	\$ 925,352.03	\$ 6,036.44
<i>Administration Fund:</i>				
State Treasurer.....	33,388.56	698.37	*34,086.93	-----
<i>Federal Aid:</i>				
Merchants National.....	261,575.58	2,674,069.78	2,600,533.15	35,112.21
<i>Counties:</i>				
Outside Banks	272,638.17	247,569.25	520,176.07	31.35
<i>Federal Aid Survey:</i>				
Citizens National.....	1,059.18	-----	-----	1,059.18
Totals.....	\$ 706,418.06	\$3,715,969.30	\$4,380,148.18	\$ 42,239.18

*Includes \$1,599.40 transferred to State Highway Fund Cash.

EXHIBIT "B"**ADMINISTRATION FUND EXPENDITURES (1919 LAW)**
For the Fiscal Year ending June 30, 1922

<i>Balance unexpended July 1, 1922:</i>		
(To begin year).....	-----	\$ 34,648.63
<i>Expenditures:</i>		
Garage Building.....	\$ 28,116.69	
New Garage House.....	3,685.14	31,801.83
Balance unexpended June 30, 1922.....	-----	\$ 2,846.80

Transferred to State Highway Fund (Exhibit "C").

EXHIBIT "C"

STATE HIGHWAY FUND—REVENUE AND EXPENDITURES (1919 LAW)

For the Fiscal Year ending June 30, 1922

<i>Revenue:</i>		
Sales T. N. T., Discount on Cement, Interest, Etc.....	\$	26,732.90
Transferred from Administration Fund as of June 30, 1922.....		2,846.80
Balance Unexpended, July 1, 1922.....		220,376.02
	\$	249,955.72
<i>Expenditures and Charges:</i>		
CHARGES—Allotments Construction Projects by State Highway Commission.....	\$	46,993.08
EXPENDITURES—Preliminary Survey (Schedule 1).....	11.00	
Truck Expense.....	1,979.84	
Truck Rental—Net Refunds, Revenue of Previous Year.....	981.33	
Maintenance (Schedule 1).....	3,691.99	6,664.16
Total Expenditures and Charges.....	\$	53,657.24
Balance Unexpended June 30, 1922 (Exhibits "A" and "AA").....		196,298.48
	\$	249,955.72

SCHEDULE "C-1"

DETAILS OF PRELIMINARY SURVEY AND MAINTENANCE ON STATE HIGHWAY FUND (1919 LAW)

For the Fiscal Year ending June 30, 1922

<i>Preliminary Survey (Exhibit "C-1")</i>		
Stokes 121	8.00	\$.....
Randolph 101	3.00	11.00
<i>Maintenance (Exhibit "C"):</i>		
Durham County.....	\$ 825.00	\$.....
Cumberland County.....	1,500.00	
Granville County.....	1,151.99	
Alexander County.....	215.00	3,691.99

EXHIBIT "D"—Part 1

CONSTRUCTION PROJECTS (1919 LAW)—CREDITS AND CHARGES
For the Fiscal Year ending June 30, 1922

<i>Credits:</i>		
Allotments to Construction Projects out of State Highway Fund (Exhibit "C").....	\$ 46,993.08	
Received from Federal Aid and Counties.....	2,614,061.23	
Advances to Federal Aid and Counties by State Highway Fund.....	288,215.05	
Adjustments and Refunds.....	2,844.34	
Total Credits.....		2,952,113.70
<i>Charges:</i>		
Expended on Construction Projects (Exhibit "E").....		4,138,503.10
<i>Charges Exceed Credits as Above</i>		1,186,389.40
<i>Balance, July 1, 1921 (Credit)</i>		1,264,680.12
<i>Balance on Books June 30, 1922. (Exhibit "A")</i>		
Credits on Projects.....	699,122.71	
Overdrafts on Projects.....	620,831.99	\$ 78,290.72
<i>Credits:</i>		
Balance on books June 30, 1922—part 1.....	\$.....	\$ 78,290.72
Estimated balance on Participation (Exhibit "E") Federal Aid Due by U. S.....	673,387.22	
County—Due by Counties.....	349,751.61	1,023,138.83
Total Credits.....		\$1,101,429.55
<i>Charges:</i>		
Cancel amount carried as State Highway Fund Advances, which have been credited to Projects in lieu of Estimated Participation as noted above under Credits. Debit Projects and Credit Advances.....		945,850.82
<i>Balance—Estimated Actual, June 30, 1922:</i>		
Credit on Projects.....	\$495,439.87	
Overdrafts on Projects.....	339,861.14	\$155,578.73

EXHIBIT "F"

FUND BALANCE SHEET BY FUNDS (1921 LAW)

As of June 30, 1922

ASSETS

	Total	Construc- tion	Maintenance
<i>Cash: (Schedule "F-1")</i>			
State Treasurer—Construction.....\$226,729.02			
State Treasurer—Maintenance.....79,343.70	\$306,072.72	\$ 226,729.02	\$ 79,343.70
<i>Advances to Contractors:</i>			
Material to be deducted from estimates.....	133,382.29	133,382.29	
<i>Federal Aid:</i>			
Due by U. S. on approved projects.....15,325.93			
Apportioned by Bureau of Public Road for fiscal year 1922 (Exhibit "J").....1,709,333.90	1,724,659.83	1,724,659.83	
<i>State Highway Fund: (1919 Law) (Exhibits "A" and "AA")</i>			
For cash advances.....625,000 00			
For truck supplies charged to counties (1919 law).....47,876.45			
For cash advances F. A. projects....141,434.43	814,310.88	189,310.88	625,000.00
<i>Deferred Debits:</i>			
Construction working funds.....40,547.12			
Maintenance working fund99,950.00			
Lenoir County — Advances pending adjust- ment of contracts with county.....257,236.51			
Maintenance material inventory.....28,859.42	426,593.05	297,783.63	128,809.42
<i>Construction Fund:</i>			
Due from maintenance (Contra).....	296,589.74	296,589.74	
	<u>\$3,701,608.51</u>	<u>\$2,863,455.39</u>	<u>\$ 833,153.12</u>

LIABILITIES

	Total	Construction	Maintenance
<i>Deferred Credits:</i>			
Due various Counties for advances on construction, for which future allotments are to be made to repay.....	\$ 786,702.80	\$ 786,702.80	\$
<i>Maintenance Fund:</i>			
Due to Construction Fund (Contra).....	296,589.74		296,589.74
<i>Fund Balances:</i>			
Construction:			
Allotments to Construction project: (Exhibits "K" and "L"):			
Credit balances.....\$18,850,439.08			
Less: Overdrafts.....345,094.18			
Net balance to Projects.....\$ 18,505,344.90			
Less: Deficit S. H. Construction Fund (Exhibit "I").....17,299,286.21			
	1,206,058.69		
Add: Federal Aid Construction Fund (Exhibit "J").....875,693.90			
Net balance to Construction Funds (including encumbrances).....2,081,752.59		2,081,752.59	
<i>Maintenance:</i>			
Balance Maintenance Fund (Exhibit "G").....536,563.38			536,563.38
<i>Fund Balances</i>	2,618,315.97		
	3,701,608.51	2,868,455.39	833,153.12

SCHEDULE "F-2"

CASH RECEIPTS, DISBURSEMENTS AND BALANCES (1921 LAW)
For the Fiscal Year ending June 30, 1922

	Balance July 1, 1921	Receipts	Disbursements	Balance June 30, 1922
<i>State Highway Construction Fund:</i>				
State Treasurer.....	\$ 359,741.78	\$7,187,001.46	\$7,320,014.22	\$ 226,729.02
<i>State Highway Maintenance Administration Fund:</i>				
State Treasurer.....	150,321.13	2,831,027.53	2,902,004.96	79,343.70
Totals.....	\$ 510,062.91	10,018,028.99	10,222,019.18	\$ 306,072.72

EXHIBIT "G"

MAINTENANCE FUND (1921 LAW)—REVENUE AND EXPENDITURES
For the Fiscal Year ending June 30, 1922

REVENUE		
<i>Automobile License and Gasoline Tax:</i>		
From Secretary of State to Treasurer.....		\$2,828,649.18
Balance July 1, 1921.....		157,369.76
		\$2,986,018.94
EXPENDITURES AND CHARGES		
<i>Equipment:</i>		
Maintenance.....	\$136,075.98	
Camp.....	10,091.06	
Floating Gang.....	6,447.80	
Small Tools.....	846.79	
		153,461.63
<i>Maintenance:</i>		
Districts (Schedule "G-1").....	\$1,891,381.64	
General.....	22,208.83	
Repairs and Supplies.....	8,465.89	
Floating Gang Material.....	5,502.63	
Floating Gang on Bridges.....	21,197.53	
Draw Bridges.....	1,620.31	
		1,950,466.83
<i>Administration:</i>		
Interest on Note Due 9-3-1921.....	\$500.00	
Interest on Bonds (State Treasurer).....	142,140.00	
Appropriation for Administration.....	202,887.10	
		345,527.10
<i>Total Expenditures and Charges.....</i>		\$2,449,455.56
<i>Balance June 30, 1922 (Exhibit "F").....</i>		536,563.38
		\$2,986,018.94

SCHEDULE "G-1"

DETAILS OF MAINTENANCE TO DISTRICTS ON MAINTENANCE FUND

For the Fiscal Year ending June 30, 1922

	Direct Labor	Material Used	Floating Gang Maintenance	Motor Truck Expense	Supervision Inspection	Marking and Signing	General and Overhead	Sundry Repairs and Supplies	Sundry Loading Total Assembling	Totals
First.....	\$ 120,708.24	\$ 18,025.33	\$ 5,013.32	\$ 95,857.24	\$ 11,937.41	\$ 63.21	\$ 1,997.72	\$ 10,266.61	\$ 59.20	\$ 263,988.28
Second.....	86,895.13	15,015.87	-----	95,666.23	8,452.62	2,508.13	1,451.06	7,807.29	-----	217,796.33
Third.....	99,538.62	17,870.17	536.53	50,904.24	7,308.73	57.60	180.00	7,509.65	-----	183,905.54
Fourth.....	135,407.26	16,495.51	470.18	82,269.47	7,984.94	258.81	1,812.70	16,784.02	-----	261,482.89
Fifth.....	92,886.62	15,468.00	25.00	86,297.86	9,736.64	36.27	1,425.75	15,922.24	-----	221,796.38
Sixth.....	89,977.36	7,176.93	-----	78,440.07	10,266.42	184.58	1,595.30	7,992.35	-----	195,633.01
Seventh.....	112,943.13	28,129.98	-----	45,372.60	9,314.70	28.11	1,904.69	12,653.32	-----	210,346.53
Eighth.....	89,854.49	11,547.57	-----	36,029.27	7,858.52	147.54	300.48	10,587.88	-----	156,325.75
Ninth.....	104,010.09	21,447.98	-----	38,748.77	8,362.59	66.66	44.00	7,426.84	-----	180,106.93
Totals (Exhibit "G")	\$ 932,280.94	\$ 151,175.34	\$ 6,045.03	\$ 609,585.75	\$ 81,222.57	\$ 3,350.91	\$ 10,711.70	\$ 96,950.20	\$ 59.20	\$1,891,381.64

EXHIBIT "H"

ADMINISTRATION FUND (1921 LAW)—APPORTIONMENT AND EXPENDITURES
For the Fiscal Year ending June 30, 1922

APPORTIONMENT

<i>Apportionment from Maintenance Fund:</i>		
(Limited to \$250,000)-----	\$-----	\$ 202,887.10
		\$ 202,887.10
EXPENDITURES		
<i>Official:</i>		
Salaries, Per Diem, and Expenses of Chairman, Commissioners and Engineer-----	8,321.50	
Upkeep of Official Automobiles-----	1,287.78	\$ 29,609.28
<i>General and District Offices:</i>		
Salaries-----	96,999.24	
Office Expense-----	27,084.16	
Office Supplies-----	13,853.89	
Furniture and Fixtures-----	12,998.65	
Technical Supplies-----	471.10	
Traveling and Incidental-----	8,718.55	
Highway Building Expense-----	10,972.33	
Highway Bulletin:		
Cost Publishing and Mailing-----\$3,980.73	2,179.90	
Less: Advertising Receipts-----	1,800.73	173,277.82
		\$ 202,887.10

EXHIBIT "I"

CONSTRUCTION FUND (1921 LAW)—REVENUE AND EXPENDITURES
For the Fiscal Year ending June 30, 1922

REVENUE		
<i>Proceeds from Sale of Bonds (State Treasurer).....</i>		\$ 6,045,775.00
<i>Sales of Plans, Discount on Cement, Interest and Sundry Revenue.....</i>		46,269.61
<i>Total Revenue.....</i>		\$ 6,092,044.61
<i>Deficit June 30, 1922 (Exhibit "F")—Excess Expenditures and Deficit to begin year over Revenue during year.....</i>		17,299,286.21
		\$ 23,391,330.82
EXPENDITURES AND CHARGES		
<i>Allotments to Construction Projects—From State Highway Commission (Exhibit "K").....</i>		\$ 21,190,538.12
<i>Toll Roads and Bridges Acquired.....</i>		56,007.05
<i>Fixed Property:</i>		
Construction Equipment.....	\$58,430.01	
Garage Equipment.....	3,679.01	
New Garage.....	1,305.72	
Garage Additions.....	7,959.19	
Office Building.....	79,433.63	
Furniture and Fixtures.....	22,125.52	
Technical Instruments and Supplies.....	76,386.20	
Columbus County Sand Pit.....	515.50	
		249,634.78
<i>Motor Cars and Trucks:</i>		
Accessories and Supplies.....	\$204,755.47	
Expenses.....	228,499.66	
Maintenance.....	24,858.69	
		458,113.82
<i>Construction Expenses:</i>		
Material.....	\$661.90	
Equipment.....	69,578.78	
Rock Quarry.....	912.72	
Testing.....	71,817.96	
Bridge Sounding.....	246.63	
Bridge Material.....	801.21	
		144,019.20
<i>General and Overhead.....</i>		97,717.15
<i>Total:—Allotments.....</i>	\$21,190,538.12	
<i>Expenditures.....</i>	1,005,692.00	
		\$ 22,196,230.12
<i>Deficit July 1, 1921.....</i>		1,195,100.70
		\$ 23,391,330.82

EXHIBIT "J"

FEDERAL AID CONSTRUCTION FUND (1921 LAW)—REVENUE AND CHARGES
 For the Fiscal Year ending June 30, 1922

<i>Revenue:</i>	
Apportionment by Bureau of Public Roads, U. S. Department of Agriculture, Out of \$75,000,000.00 appropriation for the fiscal year 1922 to the State of North Carolina.	\$ 1,709,333.90
<i>Charges:</i>	
Allotments to Approved Construction Projects (Exhibit "K").....	833,640.00
<i>Balance June 30, 1922 (Exhibit "F")</i>	\$875,693.90

EXHIBIT "K"

CONSTRUCTION PROJECTS (1921 LAW)—CREDITS AND CHARGES
 For the Fiscal Year ending June 30, 1922

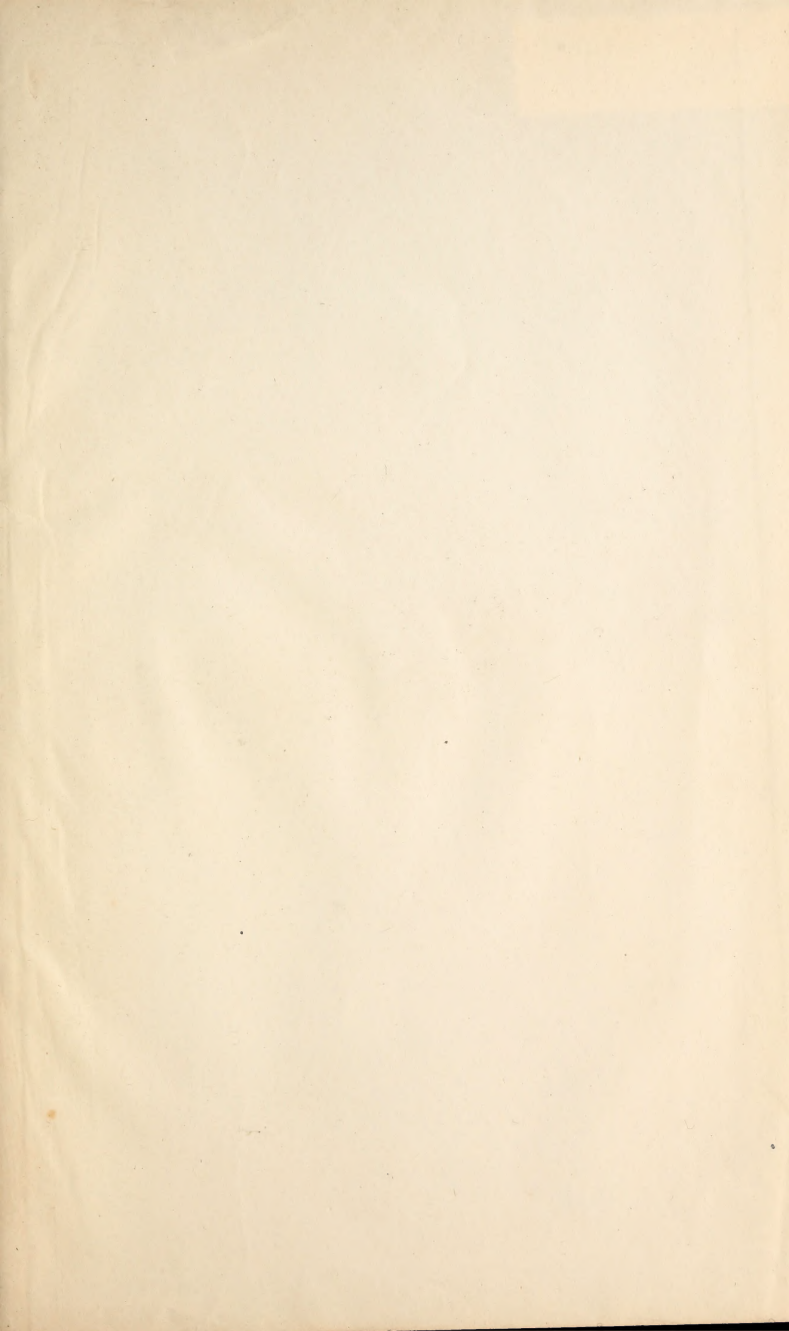
<i>Credits:</i>	
Allotments to Construction Projects Out of State Highway Construction Fund (Exhibit "I").....	\$21,190,538.12
Allotments to Construction Projects Out of Federal Aid Construction Fund (Exhibit "I").....	833,640.00
Outside Participation in State Highway Construction Projects.....	4,401.14
<i>Total Credits</i>	\$ 22,028,579.26
<i>Charges:</i>	
Expended on Construction Projects.....	5,150,239.83
<i>Excess Credits Over Charges</i>	\$ 16,878,339.43
<i>Balance July 1, 1921</i>	1,627,005.47
<i>Balance June 30, 1922:</i>	
Credits on Projects.....	\$18,850,439.08
Overdrafts on Projects.....	345,094.18
	\$18,505,344.90

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